KEY TO THE ISOPODS OF THE PACIFIC COAST OF NORTH AMERICA, WITH DESCRIPTIONS OF TWENTY-TWO NEW SPECIES.

By Harriet Richardson.

The isopods of the Pacific coast of North America have claimed the attention of a number of naturalists during the last half of the nineteenth century. Among the first to contribute to the knowledge of the fauna of that region was Dana. Stimpson also belongs to the earlier part of that period; his work on the Crustacea and Echinodermata of the Pacific shores of North America, published in 1857, was the first special treatise on the forms of that locality. In connection with the work of the later part of the past fifty years, the names of Stuxberg, Lockington, and Harford form one group as contemporaneous workers (1875–76), those of Schiœdte and Meinert, and Budde-Lund, another group (1883–85), while the publications of Dr. Hansen and Dr. Benedict represent the latest (1898) work on the isopods of that coast.

The number of species already described is 75, and 22 are added in the present work. These species represent 44 genera and 16 families, as shown in the following table:

LIST OF TRIBES, FAMILIES, GENERA, AND SPECIES.

The author has used Dr. Benedict's keys for the genera *Synidotea* and *Arcturus*, and is indebted to Professor Sars for many suggestions obtained from his excellent work on the Crustacea of Norway. In many places his synopses of the families and genera have been used in entirety. Other authors have been most helpful; Hansen on the *Cirolanidæ;* Schiœdte and Meinert on the *Cymothoidæ;* Budde-Lund on the *Oniscidæ*, and others, to whose works specific references are made.

The present paper is based on material contained in the U. S. National Museum.

ANALYTICAL KEY TO TRIBES OR SUPERFAMILIES OF PACIFIC COAST ISOPODA.[1]

a. Legs of first pair cheliform. Uropoda terminal. Pleopoda, when distinctly developed, exclusively natatory ..... I. CHELIFERA (p. 819).
a'. Legs of first pair not cheliform.
b. Uropoda lateral.
c. Uropoda forming together with the terminal segment of the metasome a caudal fan. Pleopoda for the most part natatory .... II. FLABELLIFERA (p. 820).
c'. Uropoda valvelike, inflexed, arching over the pleopoda, which to a great extent are branchial ..... III. VALVIFERA (p. 842).
b'. Uropoda terminal.
c. Free forms.
d. Pleopoda exclusively branchial, generally covered by a thin opercular plate (the modified first pair) ..... IV. ASELLOTA (p. 856).
d'. Pleopoda fitted for air-breathing ..... V. ONISCOIDEA (p. 860).
c'. Parasitic forms. ..... VI. EPICARIDEA (p. 867).

I. CHELIFERA.

Family I. TANAIDÆ.

Body scarcely attenuated behind. Mandibles without palp. Coxal plates inconspicuous. Superior antennæ with one multiarticulate flagellum. Anterior maxillæ with only a single masticatory lobe; posterior ones quite rudimentary. Second pair of legs ambulatory in character. Epignath of maxillipeds narrow, falciform.

1. TANAIS Audouin and Milne-Edwards.

Antennæ short, subequal. Pleon five-jointed; fourth joint short; fifth joint terminated by a pair of single-branched filamentary uropoda. Only three pairs of pleopoda. Palp of anterior maxillæ biarticulate. Eyes well developed. Superior antennæ three-articulate, with small terminal flagellum.

ANALYTICAL KEY TO THE SPECIES OF TANAIS.

a. Inferior antennæ scarcely half the length of superior antennæ. Pereiopoda having the first three joints short and broad, affixed to sides of pereion like plates of mail ..... 1. *Tanais loricatus* Spence Bate.
a'. Inferior and superior antennæ of nearly equal length. Pereiopoda with joints not dilated, slender ..... 2. *Tanais alascensis*, new species.

1. TANAIS LORICATUS Spence Bate.

Tanais loricatus SPENCE BATE, Lord's Naturalist in British Columbia, II (1866), p. 282.

Habitat.—Esquimault Harbor, British Columbia.

2. TANAIS ALASCENSIS, new species.

Body three and a half times longer than broad.
Head large, narrowed anteriorly. Frontal margin almost straight.

[1] Sars's analytic key has been used with slight modifications. Sars's "An Account of the Crustacea of Norway," II, Isopoda (1896), Pts. I, II, p. 3.

First pair of antennæ short, stout, consisting of four joints, the first joint being the longest. Second pair of antennæ more slender, a little longer, consisting of four joints, the first joint being longest, and a rudimentary flagellum. Eyes small and pedunculated.

The first segment of the thorax is confluent with the head. The second, third, fourth, and fifth segments increase slightly in length; the fifth and sixth are about equal; the seventh is not quite so long as the preceding one.

The abdomen is composed of five segments, the first three of which are subequal; the fourth is short, about half as long as any of the others and also narrower; the terminal segment is as long as the two preceding ones together, and is rounded posteriorly, with a slight median notch. The segments of the abdomen decrease in width gradually from the first to the terminal segment. The terminal filaments are seven jointed and single-branched, and are furnished at their extremities with a few long hairs.

FIG. 1.—TANAIS ALASCENSIS, NEW SPECIES. ×8. *a*, DORSAL VIEW; *b*, LAST TWO JOINTS OF LEG OF THE FIRST PAIR.

The first pair of legs are stout and chelate; the propodus is produced into a strong immovable finger, irregular in shape, having its central portion raised and truncate on its upper surface, which is distinctly serrate. The dactylus is likewise serrate on its inner surface. The other legs are slender, with a gradual increase in stoutness.

Color brown, marked in some specimens with a darker brown, and having oval patches of the darker color on the head.

Kyska Harbór, Alaska; Mr. W. H. Dall collector; depth, 6 to 8 fathoms.

Type.—No. 22563, U.S.N.M.

II. FLABELLIFERA.

ANALYTICAL KEY TO THE FAMILIES OF FLABELLIFERA.

a. Pleon consisting of six segments.

b. Uropoda with one of the branches almost obsolete or rudimentary—not lamelliform ..... Family II. LIMNORIIDÆ (p. 821).

b'. Uropoda with both branches developed; mostly lamelliform.

c.[1] Maxillipeds with the palp free, the margins of the last two joints more or less setose, never furnished with hooks.

[1] The four points following *b'* are taken from Hansen's analytic key of the Cirolanidæ (Vidensk. Selsk. Skr., 6th ser., natur. og math. Afd. V, 1890, p. 317), as translated by Stebbing, Hist. of Crust., 1893, pp. 340, 341.

d. Mandibles with the rather broad, more or less tridentate, cutting edges meeting squarely behind the large upper lip; the secondary plate and peculiar equivalent for the molar well developed. First maxillæ having the plate of the first joint armed with three spines, that of the third with many. Second maxillæ of moderate size, the three free plates very setose. Maxillipeds with the palp rather broad, very setose.

Family III. CIROLANIDÆ (p. 822).

d'. Mandibles with the distal part produced into a long prominent process, the pair much overlapping; the secondary plate and molar evanescent. First maxillæ having the plate of the first joint unarmed, of the third carrying one very long spine. Second maxillæ small and feeble, the free plates almost rudimentary, with few setæ. Maxillipeds with the palp narrowed, not very setose..... Family IV. CORALLANIDÆ (p. 825).

c'. Maxillipeds with the palp embracing the cone formed by the distal parts of the mouth organs, the inner upper margin and apex never setose, the apex and sometimes the inner upper margin at least in the males and females without eggs, being furnished with outward curved hooks.

d. Mandibles with the secondary plate very often visible; palp with no inflated joint. Maxillipeds commonly seven-jointed, sometimes four-jointed, the last joint in the latter case rather short, obtuse. Antennæ[1] long, unequal, with well-defined peduncle and flagellum ... Family V. ÆGIDÆ (p. 825).

d'. Mandibles with no secondary plate; the palp in adults with first joint or both first and second joints inflated. Maxillipeds always four-jointed, last joint rather long and narrow, subacute. Antennæ[1] much reduced without clear distinction between peduncle and flagellum.

Family VI. CYMOTHOIDÆ (p. 828).

a'. Pleon consisting of less than six segments.

b. Pleon with two segments. Uropoda with one branch fixed, immovable.

Family VII. SPHÆROMIDÆ (p. 831).

b'. Pleon with four segments. Uropoda with both branches movable.

Family VIII. SEROLIDÆ (p. 842).

Family II. LIMNORIIDÆ.

2. LIMNORIA Leach.

3. LIMNORIA LIGNORUM (Rathke).

Cymothoa lignorum RATHKE, Skrivt. af Naturh. Selsk., V, 1799, p. 101, pl. 3, fig. 14 (White).

Limnoria tenebrans LEACH, Ed. Encycl., VII, 1813, p. 433 (Am. ed., p. 273); Trans. Linn. Soc., XI, 1815, p. 371; Dict. Sci. Nat., XII, 1818, p. 353.—DESMAREST, Consid. Crust., 1825, p. 312.—LATREILLE, Regne Anim., IV, 1829, p. 135.—EDWARDS, Annot. de Lamarck, V, 1838, p. 276; Hist. Nat. des Crust., III, 1840, p. 145; Regne Anim., Crust., 1849, p. 197, pl. 67, fig. 5.—GOULD, Invert. Mass., 1840, pp. 338–354.—VERRILL, Proc. Am. Assoc., 1873 (1874), p. 367.

Limnoria lignorum WHITE, Pop. Hist. Brit. Crust., 1857, p. 227, pl. 12, fig. 5.—BATE, Rep. Brit. Assoc., 1860 (1861), p. 225.—BATE and WESTWOOD, Brit. Sess. Crust., II, 1868, p. 351.—NORMAN, Rep. Brit. Assoc., 1868 (1869), p. 288.—VERRILL, Am. Journ. Sci., 3d ser., VII, 1874, pp. 133, 135; Proc. Am. Assoc., 1873 (1874), p. 371; Report U. S. Commissioner of Fish and Fisheries, 1871, Pt. I, p. 379 (85).—HARGER, Report U. S. Commissioner of Fish and Fisheries, 1874, Pt. I, p. 571 (277), pl. VI, fig. 25; Proc. U. S. Nat. Mus., II, 1879, p. 161.—STEBBING, Trans. Devon. Assoc., 1874, p. 8; Ann. Mag. Nat. Hist., 4th ser., XVII, 1876, p. 79.—SMITH, Proc. U. S. Nat. Mus., II, 1879 (1880), p. 232, fig. 2.

[1] Inserted by author.

Limnoria uncinata HELLER, Verh. k. k. Zool. Bot. Ges. Wien, XVI, 1866, p. 734.
Limnoria lignorum HARGER, Report U. S. Commissioner of Fish and Fisheries, 1878, Pt. 4, pp. 373, 376. (See Harger for further synonymy.)
Limnoria californica HEWSTON, Proc. Cal. Acad. Sci., V, 1874, p. 24 (*nomen nudum*).

Habitat.—Pacific Ocean; Bering Island. Also found on East coast of North America from Florida to Halifax, on the coast of Great Britain, and in the North Sea. Specimens from San Diego, California, collected by Mr. Henry Hemphill and labeled "*Limnoria californica* Hewston" are in the National Museum.

Family III. CIROLANIDÆ.

ANALYTICAL KEY TO THE GENERA OF CIROLANIDÆ.[1]

a. Peduncle of second antennæ five-jointed. Plate of second joint of maxillipeds furnished with hooks. First and second pleopods alike, with at least inner branch submembranaceous. Uropoda with inner angle of peduncle produced. 3. *Cirolana.*

a'. Peduncle of second antennæ four-jointed. Plate of second joint of maxillipeds without hooks. Pleopoda with both branches submembranaceous. Uropoda with inner angle of peduncle very little produced. Superior antennæ with first joint of peduncle quite short, and extended straight in front at a right angle to remaining part of the antenna ..... 4. *Eurydice.*

3. CIROLANA Leach.

ANALYTICAL KEY TO SPECIES OF CIROLANA.

a. Head without median process. First pair of antennæ reach apex of peduncle of second pair of antennæ. Terminal abdominal segment subtriangular, armed on its posterior margin with twenty-six spines. Both branches of the uropoda rounded posteriorly and armed with spines.
4. *Cirolana harfordi* (Lockington).

a'. Head with long, straight median projection. First pair of antennæ reach the posterior margin of the third thoracic segment. Terminal abdominal segment rounded and crenulate on its posterior margin and fringed with long hairs. Inner branch of the uropoda obliquely truncate posteriorly.
5. *Cirolana linguifrons*, new species.

4. CIROLANA HARFORDI (Lockington).

Æga harfordi LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 46.
Cirolana californica HANSEN, Vidensk. Selsk. Skr., 6th ser., natur. og math. Afd. V, 1890, pp. 338, 339.

Habitat.—Victoria, British Columbia; California: Santa Rosa Island, San Diego, Catalina Harbor, Pacific Grove, Monterey Bay; Lower California, specimens lighter in color.

Miers[2] remarks upon having examined specimens of *Æga harfordi*, sent by Mr. Lockington to the British Museum and designated *Idotea*

[1] The characters in this key on the Cirolanidæ are taken from Stebbing, "History of Crustacea," (1893), p. 342.

[2] Miers, Journ. Linn. Soc. London, XVI, 1883, p. 19.

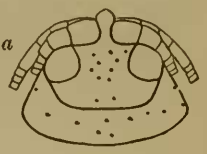
harfordi in a manuscript note of the author. He considers that the specimens belong to the genus *Cirolana*, or a closely allied type, without further identifying them. Hansen[1] also states that, according to Miers, *Æga harfordi* is probably a *Cirolana*. He had not seen Lockington's description, but followed Miers regarding the systematic position of the species.

Specimens of *Æga harfordi* were sent by Mr. S. J. Holmes to the National Museum from the California Academy of Sciences, which prove to be identical with *Cirolana californica* Hansen.

5. CIROLANA LINGUIFRONS, new species.

Color, yellow, marked with scattered black dots. Body elongate-ovate, about five times longer than broad, greatly convex.

Head with the frontal margin produced in a long, straight process, rounded anteriorly and somewhat dilated. Eyes large, distinct. First pair of antennæ with joints of the peduncle large; flagellum of fifteen short joints extends to the posterior margin of the third thoracic segment. Second pair of antennæ, with a flagellum of thirteen long joints, extend to the posterior margin of the fifth thoracic segment.



The first three segments of the thorax are short; the other four segments are long. The epimera of the second, third, and fourth segments are not produced at the apex; those of the fifth, sixth, and seventh but slightly produced.

All the abdominal segments conspicuous, the first five being of equal length. The terminal segment is rounded posteriorly, faintly crenulate and fringed with long hairs. The base of this segment is raised above the other portion and has a well-defined edge with two points extending backward, one on either side of the median line. The uropoda extend beyond the tip of the abdomen; the inner branch is obliquely truncate; the outer branch is more rounded; both branches are fringed with long hairs.

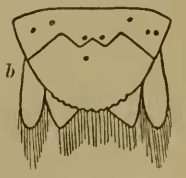


FIG. 2.—CIROLANA LINGUIFRONS. × 13½. *a*, HEAD; *b*, TERMINAL SEGMENT.

The prehensile legs are short; the gressorial legs are long and slender. The legs increase gradually in length from the first to the seventh pair.

Two specimens, from Monterey Bay, California, collected by Mr. Heath from sandy shore at mean tide.

Type.—No. 22564, U.S.N.M.

[1] Hansen, Vidensk. Selsk. Skr., 6th ser., natur. og math. Afd. V, 1890, pp. 338, 339; for synonymy see p. 357.

4. EURYDICE Leach.

6. EURYDICE CAUDATA, new species.

Body elongate and narrow. In male, abdomen is equal in length to thorax; in female, it is shorter. Surface of body smooth.

Head widely rounded in front; its anterior margin narrowly thickened. Eyes large and round and situated at a distance of one-third the width of the head apart. First pair of antennæ extend to the posterior margin of the head; flagellum contains five articles, the first of which is very long and those following quite short. The second pair of antennæ extend as far as the posterior margin of the fourth segment of the abdomen; the flagellum consists of twenty-five long, slender joints. In the female, the second pair of antennæ are much shorter, reaching only to the posterior margin of the last thoracic segment; the flagellum contains about twenty joints.

The thoracic segments are subequal. The epimera are narrow, and those of the last three or four segments acutely pointed.

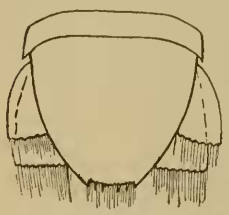


FIG. 3.—EURYDICE CAUDATA; LAST TWO ABDOMINAL SEGMENTS. (GREATLY ENLARGED.

All the abdominal segments are visible in a dorsal view. The terminal segment is rounded at the sides and truncate at its extremity, the lateral angles being produced in a short triangular process, between which the posterior margin is distinctly denticulate, and bears four spines, which are about twice as long as the lateral teeth. The uropoda are short, not reaching the extremity of the terminal segment, are truncate and crenulate on their posterior margins. The uropoda, as well as the terminal, segment are fringed with short hairs.

The legs are long and slender and armed with many spines.

Color, light brown marked with black spots.

Individuals of this species were collected at Isthmus Cove, Catalina Island, California, by the U. S. Fish Commission steamer *Albatross*.

Type.—No. 22565, U.S.N.M.

This species resembles *E. grimaldii* Dollfus[1] more closely than it does any other species of the genus. It differs in the following characters:

1. The greater number of joints in the flagellum of the first pair of antennæ. In our species there are five joints, while in *E. grimaldii* the flagellum is uniarticulate.

2. In the fewer number of joints in the flagellum of the second pair of antennæ. In our species there are only twenty-five, while in *E. grimaldii* the flagellum contains thirty-two articles.

3. In the presence of four spines on the posterior margin of the

[1] Bull. Soc. Zool. France, XIII, 1888, pp. 35, 36; Sur Quelques Crustacés Isopodes du Littoral des Açores, A. Dollfus.

terminal segment. In *E. grimaldii* the posterior margin is denticulate. In our species it is denticulate, and also bears four spines.

Family IV. CORALLANIDÆ.

5. CORALLANA Dana.

7. CORALLANA TRUNCATA, new species.

Body elongate, about three and a half times longer than wide; color, yellow.

Head with a small median point. Eyes large, situated but a little distance apart. First pair of antennæ, with a flagellum of about nine articles, extend to the antero-lateral angle of the first thoracic segment. Second pair of antennæ broken in specimen.

First segment of the thorax is as long as the head, and about one and a half times longer than any of the other segments. Epimera of the second and third segments narrow; those of the remaining segments very broad.

The first abdominal segment is almost entirely covered by the last thoracic segment. The second, third, and fourth segments are tuberculated on their posterior margins. The fifth segment is also tuberculated, the tubercles on either side of the median line of tubercles being larger and more conspicuous. At the base of the terminal segment are four tubercles, the two center ones being the larger. The terminal segment is subtriangular with truncate apex. The posterior margin is armed with spines. The inner branch of the uropoda is truncate posteriorly, and armed with spines; it is about twice as broad as the outer branch, which is lanceolate in shape.

FIG. 4.—CORALLANA TRUNCATA. 13½. *a*, HEAD; *b*, ABDOMEN AND LAST THORACIC SEGMENT.

There is but one specimen, from Catalina Island, California; collected by Dr. J. G. Cooper.

Type.—No. 22566, U.S.N.M.

Family V. ÆGIDÆ.

ANALYTICAL KEY TO GENERA OF ÆGIDÆ.

a. Body rather compact. Superior antennæ short, with first two pedunculer joints more or less expanded. Epistome large, linguiform, projecting between the bases of inferior antennæ. Maxillipeds with palp composed of five joints. Anterior pairs of legs with propodus simple, cylindrical, not expanded, dactylus abruptly curved in middle. Front separating the whole or a great part of the first article of the first pair of antennæ. Flagellum of first pair of antennæ composed of many articles. Abdomen compact.....6. *Ega*.

a'. Body more depressed than in *Æga*. Superior antennæ short, with basal joints not expanded. Epistome very small and narrow. Maxillipeds with palp composed of only two joints. Anterior pair of legs with propodus more or less expanded, dactylus forming a very large and evenly curved hook. Front covering more or less the peduncle of the first pair of antennæ. Flagellum of first pair of antennæ composed of four to six articles. Abdomen relaxed..7. *Rocinela*.

6. ÆGA Leach.

ANALYTICAL KEY TO SPECIES OF ÆGA.

a. Eyes very small; second joint of first pair of antennæ without process at its apex; terminal abdominal segment triangular, with rounded apex; inner branch of uropoda with apex faintly arcuate obliquely.

8. *Æga microphthalma* Dana.

a'. Eyes almost contiguous; second joint of first pair of antennæ with a process at its apex nearly as long as following joint; terminal abdominal segment with its apex arcuate-truncate; inner branch of uropoda subtruncate.

9. *Æga leconlii* (Dana).

8. ÆGA MICROPHTHALMA Dana.

Æga microphthalma Dana, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 176.—Stimpson, Journ. Bos. Soc. Nat. Hist., VI, 1857, p. 68.

Habitat.—Monterey, California.

9. ÆGA LECONTII (Dana).

Ægacylla lecontii Dana, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 177.—Stimpson, Journ. Bos. Soc. Nat. Hist., VI, 1857, p. 69.

Habitat.—California.

Body elongate, oval; surface smooth; color yellow, with a few brown dots; eyes reddish brown.

Head with anterior margin bisinuated, the median point separating the basal joints of the first pair of antennæ and extending one third the length of these joints. Eyes large, oval, very close together at upper inner angle. First pair of antennæ with basal joints very large, dilated; second joint of peduncle dilated, and with a process at its apex extending nearly the length of the third joint; third joint very narrow, about one-third the width of two preceding joints; flagellum, composed of seven joints, extends the length of the peduncle of second pair of antennæ. Second pair of antennæ, with a flagellum of twelve joints, extend almost to the posterior margin of the first thoracic segment.

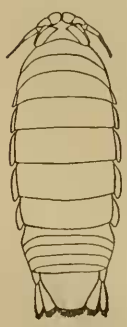


Fig. 5.—Æga leconlii (Dana). × 2.

The last four thoracic segments are each a little longer than any of the first three. The epimera are narrow, with rounded post lateral angles.

The five abdominal segments are of equal length. The terminal segment is subtriangular with truncate extremity; its posterior margin is crenulate and fringed with hairs. The uropoda exceed slightly the length of the abdomen. The inner branch

is about twice as wide as the outer branch; is obliquely truncate, and crenulate. The outer branch is narrow, rounded posteriorly, and smooth. Both branches are fringed with hairs.

The legs are long and slender. Five spines are present on the merus of the prehensile legs. The gressorial legs are but slightly spinulose.

Two specimens examined were collected at Monterey Bay, California, by Mr. Heath.

The description of this species of *Æga* by Dana as *Ægacylla leeontii* was from a young specimen.[1] The individual sent us is thought to be the adult form, and differs from Dana's description[2] of the young individual in the crenulated posterior margin of the terminal segments, in the truncated inner branch of the uropoda, and in the addition of two joints to the length of the flagellum of the second pair of antennæ.

7. ROCINELA Leach.

ANALYTICAL KEY TO SPECIES OF ROCINELA.

a. Flagellum of second pair of antennæ with fourteen to sixteen joints.
b. Propodus of prehensile legs with two to four spines.
c. First thoracic segment with antero-lateral angles produced hornlike at sides of head. Frontal margin of head produced. Spots wanting on fourth and fifth abdominal segments and base of terminal segment.
10. *Rocinela cornuta* Richardson.
c'. First thoracic segment normal. Frontal margin of head not produced. Spots present on fourth and fifth abdominal segments and base of terminal segment ..... 11. *Rocinela belliceps* (Stimpson).
b'. Propodus of prehensile legs with five or six spines.
12. *Rocinela laticauda* Hansen.
a'. Flagellum of second pair of antennæ with ten to eleven joints.
b. Tubercles developed on all the segments of the body.
13. *Rocinela tuberculosa* Richardson.
b'. No tubercles developed on body. Terminal segment of body ornamented with a very wide crescentiform band, from whose posterior border three large hastiform stripes project backwards.
14. *Rocinela aries* Schiœdte and Meinert.

10. ROCINELA CORNUTA Richardson.

Rocinela cornuta Richardson, Proc. Am. Phil. Soc., XXXVII, 1898, p. 12, figs. 1, 2.

Habitat.—Off Shumagin Bank, Alaska.

11. ROCINELA BELLICEPS (Stimpson).

Æga belliceps Stimpson, Proc. Acad. Nat. Sci. Phila., XVI, 1864, p. 155.
Æga alaskensis Lockington, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 46.
Rocinela alascensis Richardson, Proc. Am. Phil. Soc., XXXVII, 1898, p. 11.

[1] Schiœdte and Meinert regard *Ægacylla* Dana as synonymous with *Æga*, and remark that Dana's specimen, by which the genus *Ægacylla* was instituted was a young *Æga*. See Naturhistorisk Tidsskrift, XII, 1879-80, p. 334. See also Lütken, Vid. Medd. Naturh. For., 1860, p. 180.

[2] There are no specimens of the young in the National Museum.

Habitat.—Cortes Bank, California, to Alaska and Bering Sea.

12. ROCINELA LATICAUDA Hansen.

Rocinela laticauda HANSEN, Bull. Mus. Comp. Zool., XXXI, 1897, No. 5, pp. 108, 109.—RICHARDSON, Proc. Am. Phil. Soc., XXXVII, 1898, pp. 14, 15, figs. 5, 6.

Habitat.—Off Acapulco; near Tres Marias Islands; off Mazatlan; off San Luis Obispo Bay, California; off Esteros Bay, California; Puget Sound, Washington; Unimak Island, Alaska.

13. ROCINELA TUBERCULOSA Richardson.

Rocinela tuberculosa RICHARDSON, Proc. Am. Phil. Soc., XXXVII, 1898, p. 16, fig. 10.

Habitat.—Southern part of Gulf of California.

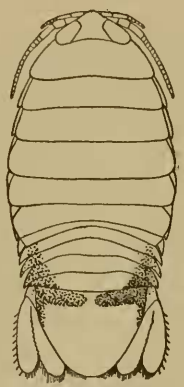


FIG. 6.—ROCINELA BELLICEPS (STIMPSON). ×2¾.

14. ROCINELA ARIES Schiœdte and Meinert.

Rocinela aries SCHIŒDTE and MEINERT, Naturhistorisk Tidsskrift, XII, 1879–80, pp. 401–403, pl. XIII, figs. 7, 8.

Habitat.—Mazatlan; Lower California; Panama Bay.

Family VI. CYMOTHOIDÆ.

ANALYTICAL KEY TO THE GENERA OF CYMOTHOIDÆ.

a. Head deeply immersed or set in the first thoracic segment, whose antero-lateral angles project forward.

b. Abdomen deeply immersed.

First pair of antennæ more often dilated, rarely compressed. First four or five segments of body long, subequal in length, except the first, which is a little longer; last two or three segments abruptly shorter, very often decreasing gradually in length. Terminal segment of abdomen subtriangular or semicircular, often bilobed. Body oblong ..... 8. *Meinertia*.

b'. Abdomen scarcely immersed.

First pair of antennæ very much compressed. Segments of thorax either equal in length or the first segment abruptly longer than the others and the last segment abruptly shorter than the others. Terminal segment of the abdomen varying in size and form. Body sub-oval, more or less contorted. 9. *Livoneca.*

a'. Head not at all immersed.

b. Body relaxed. Posterior angles of first segment of body prominent or produced, very often acute; posterior angles of the following segments increasing gradually in length, the first of these very often scarcely prominent, the posterior ones very often produced, abruptly longer than the first. Epimera of the first segments very often involuted, and extending beyond the posterior angle of the segment; posterior ones produced, acute. Sides of the first five segments of abdomen more or less profoundly incised..... 11. *Nerocila.*

b'. Body compact. Posterior angles of first segment of body scarcely prominent, occasionally produced, those of following five segments scarcely or not at all prominent; those of seventh segment produced. Epimera of first segments very often almost reaching, or not reaching by a short distance, the posterior angle of the segment. Sides of the first segments of the abdomen, whole or obscurely emarginated, of the posterior ones gradually more profoundly emarginated or incised..... 11. *Anilocra.*

8. MEINERTIA Stebbing.[1]

15. MEINERTIA GAUDICHAUDII (Milne-Edwards).

Cymothoa gaudichaudii MILNE-EDWARDS, Hist. Nat. Crust., III, 1840, p. 271.
Ceratothoa rapax HELLER, Reise *Novara* Crust., XII, p. 146, fig. 17.
Ceratothoa gaudichaudii SCHIŒDTE and MEINERT, Naturhistorisk Tidsskrift, XIII, 1881–83, pp. 335–340, pl. XIII, figs. 11–15.

Habitat.—Mazatlan.

9. LIVONECA Leach.

ANALYTICAL KEY TO SPECIES OF LIVONECA.

a. Terminal segment obscurely carinated, and sides enfolded. Caudal appendages destitute of accessory lamellæ...16. *Livoneca californica* Schiœdte and Meinert.

a'. Terminal segment not carinated, sides not enfolded. Caudal appendages furnished with accessory lamellæ.

b. Inner branch of uropoda a little longer and wider than outer branch. Terminal segment sublinguate. Abdomen deeply set in thorax.

17. *Livoneca vulgaris* Stimpson.

b'. Inner branch of uropoda a little longer and much narrower than outer branch. Terminal segment semicircular. Abdomen less deeply inserted in thorax.

18. *Livoneca panamensis* Schiœdte and Meinert.

16. LIVONECA CALIFORNICA Schiœdte and Meinert.

Livoneca californica SCHIŒDTE and MEINERT, Naturhistorisk Tidsskrift, XIV, 1883–84, pp. 372–374, pl. XVI, figs. 1, 2.

Habitat.—Shores of California, near San Francisco.

[1] Hist. of Crust., 1893, p. 345.

17. LIVONECA VULGARIS Stimpson.

Livoneca vulgaris STIMPSON, Journ. Bos. Soc. Nat. Hist., XXII, 1857, p. 68, pl. XXII, fig. 9.—SCHIŒDTE and MEINERT, Naturhistorisk Tidsskrift, XIV, 1883–84, pp. 344–349, pl. XIV, figs. 1, 2.

Habitat.—Shores of California, near San Francisco, to Santa Margarita Island, Lower California.

18. LIVONECA PANAMENSIS Schiœdte and Meinert.

Livoneca panamensis SCHIŒDTE and MEINERT, Naturhistorisk Tidsskrift, XIV, 1883–84, pp. 349–353, pl. XIII, figs. 11, 12.

Habitat.—Mazatlan; west shores of Central America; Panama.

10. NEROCILA Leach.

19. NEROCILA CALIFORNICA Schiœdte and Meinert.

Nerocila californica SCHIŒDTE and MEINERT, Naturhistorisk Tidsskrift, XIII, 1881–83, pp. 72–76, pl. V, figs. 12, 13; pl. VI, figs. 1, 2.

Habitat.—San Diego, California; Panama Bay.

11. ANILOCRA Leach.

20. ANILOCRA OCCIDENTALIS, new species.

Body two and one-half times longer than broad.

Head large, broader than long, one-half as broad as the first thoracic segment, produced in front in a short, blunt process, whose anterior edge is roundly truncate. Eyes large, situated at a distance equal to almost half the width of the head apart. The first pair of antennæ are composed of eight joints and extend to the middle of the first thoracic segment. The second pair of antennæ are composed of nine joints and extend to the posterior angle of the first thoracic segment; they are more slender than the first pair of antennæ.

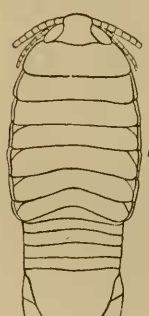


FIG. 7.—ANILOCRA OCCIDENTALIS. ×4.

The first thoracic segment is trisinuated on its anterior margin, and is one and a half times longer than the second thoracic segment. The other segments are subequal. The sixth and seventh segments are somewhat narrower than the fifth, and the seventh is a little narrower than the sixth. All the epimera are long and narrow and more or less rounded posteriorly; they extend fully to the posterior angle of their corresponding segments, a character not found in any other species of the genus.

The first abdominal segment is partly covered at the sides by the last thoracic segment. The first five segments are about equal in length and width. The terminal segment is slightly wider than long, equal in length to the other abdominal segments taken together, is impressed at the base, and posteriorly rounded. The uropoda are

longer than the last abdominal segment. Both branches are similar in shape and size; they are oarlike, with truncately rounded extremities.

The legs increase slightly in length. The basis of all the legs is carinated on the inferior margin.

Color a light brown, marked with numerous black dots over the whole surface of the body, with the exception of the posterior half of the last abdominal segment and the inner branch of the uropoda, which are a light clear yellow without spots. The outer branch of the uropoda, which is almost black, contrasts in a marked degree with the light inner branch. In the caudal segment the change from the darker to the lighter half is graduated, making the contrast less marked.

Two individuals of this species were taken; one by the U. S. Fish Commission steamer *Albatross*, station 3138, at a depth of 19 fathoms, and one by Dr. D. S. Jordan, both at Monterey Bay, California. One was imperfect.

Type.—No. 22567, U.S.N.M. Monterey Bay. Depth, 19 fathoms.

When compared with *A. lævis* Miers[1] from Peru this species differs in the shape of the anterior portion of the head, which in *A. lævis* is narrowed and rounded, while in *A. occidentalis* it is truncate; in the greater length of the first thoracic segment and the equality in length of the succeeding segments in *A. occidentalis*, while in *A. lævis* the sixth segment is the longest, the others being of nearly equal length; in the length of the epimera, which in *A. occidentalis* attain the posterior margin of the corresponding segments, while with *A. lævis* they are all very small and somewhat spiniform in the fifth to the seventh segments; in the greater breadth posteriorly of the terminal segment of the body in *A. lævis*, and in the shape and length of the uropoda in the two species, the two branches being of unequal length, lamellate in shape (the inner one the longer), and both shorter than the last segment of the body in *A. lævis*, while in *A. californica* they are equal in length, similar in shape, oarlike, and longer than the terminal segment.

Family VII. SPHÆROMIDÆ.

ANALYTICAL KEY TO THE GENERA OF SPHÆROMIDÆ.

a. Both exterior and interior branches of uropoda projecting.
  b. Terminal segment of the abdomen excavated at its extremity...12. *Dynamene*.
  b'. Terminal segment of abdomen entire.
    c. Margins of head not produced; antennæ conspicuous; legs normal; mandibles with five-jointed palp ..... 13. *Sphæroma*.
    c'. Anterior and lateral margins of head produced, concealing antennæ; propodus of first and second pairs of legs dilated, with reflexed dactylus; mandibles with three-jointed palp ..... 14. *Tecticeps*.
a'. Only exterior branch of uropoda projecting; penultimate abdominal segment in male generally produced in spine; terminal segment excavated with median tooth ..... 15. *Cilicæa*.

[1] Proc. Zool. Soc. London, 1877, p. 672, pl. LXVIII, fig. 6.

12. DYNAMENE Leach.

ANALYTICAL KEY TO THE SPECIES OF DYNAMENE.

a. Frontal margin of head produced in a quadrangular process; first two joints of first pair of antennæ dilated..... 21. *Dynamene dilatata*, new species.

a'. Frontal margin of head not produced; joints of first pair of antennæ not dilated.

b. Abdomen tuberculated. Neither branch of uropoda reaching extremity of abdomen .....22. *Dynamene tuberculosa*, new species.

b'. Abdomen not tuberculated. Inner branch of uropoda reaching extremity of abdomen.

c. Ultimate segment of abdomen ridged. Branches of uropoda of equal length. Sinus at extremity of abdomen funnel shaped.
23. *Dynamene benedicti*, new species.

c'. Ultimate segment of abdomen smooth. Outer branch of uropoda but little more than half as long as inner branch. Sinus at extremity of abdomen small .....24. *Dynamene glabra*, new species.

It has been suggested by several authors[1] that *Dynamene* may prove to be the female of *Næsa*, but until facts can be produced to substantiate this assumption, it is necessary to retain the genus *Dynamene*.

21. DYNAMENE DILATATA, new species.

Body oval; surface very granular; color yellow.

Head rugose, with its anterior margin produced in a quadrangular process, having a small median projection, rounded antero-lateral angles and a thickened edge. First pair of antennæ extend to the posterior margin of the head, first two joints flattened and enlarged; first joint oblong, second joint triangular, and half as long as preceding joint; third joint small, as long as second, but half as wide; flagellum six-jointed. Second pair of antennæ are but little longer than first pair and do not reach the posterior margin of the first thoracic segment.

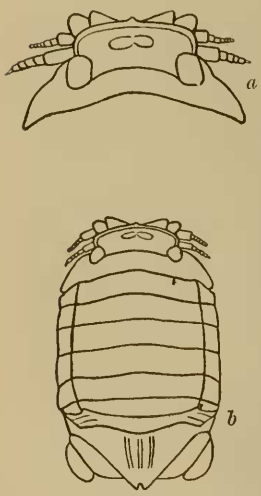


FIG. 8.—DYNAMENE DILATATA. *a*, HEAD AND FIRST THORACIC SEGMENT. × 13¾. *b*, DORSAL VIEW. × 10⅝.

The thoracic segments are of equal length. The epimera are square or oblong, with straight lateral margins.

The penultimate abdominal segment is short, and crossed with suture lines. The terminal segment is triangular with a small rounded notch at the apex. There are three longitudinal ridges on the segment, one in the median line, and one on either side of it. The uropoda are short, not reaching the extremity of the abdomen, and regularly rounded.

The legs are slender; the first two pairs are covered with long hairs,

[1] Hesse, Ann. Sci. Nat., 5th ser., XVII, pp. 5, 6; Stebbing, Hist. of Crust., 1893, p. 361; Bate and Westwood, British Sessile-Eyed Crust., II, p. 432.

and extend in an anterior direction, the other five pairs extend in a posterior direction.

The type and only specimen was collected by Mr. Heath at Monterey Bay, California, at the surface. No. 22568, U.S.N.M.

22. DYNAMENE TUBERCULOSA, new species.

Body oblong-ovate; color, light yellow, almost white; surface of abdomen tuberculated.

Head large, much broader than long, with a wide anterior margin, broadly curving on either side of a small median point. Eyes small, and situated at the extreme post-lateral angle of the head. The first pair of antennæ, composed of eight articles, reach beyond the middle of the first thoracic segment. The second pair of antennæ, composed of twelve articles, extend to the posterior angle of the first thoracic segment.

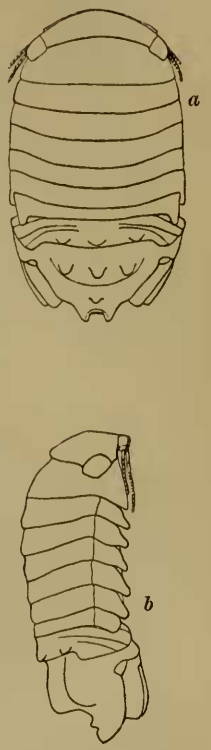


FIG. 9.—DYNAMENE TUBERCULOSA. × 8. *a*, DORSAL VIEW; *b*, LATERAL VIEW.

The first segment of the thorax is one and a half times longer than any of the other segments, which are about equal in length. The epimera, which are distinctly marked, and roundly produced at their posterior angles, are much broader than long.

The first abdominal segment is transversely crossed by three suture lines, indicated at the sides of the segment. Three small tubercles are situated in a transverse line on the posterior margin of this segment. The terminal segment is subtriangular in shape with a broad funnel-like excavation at its extremity, formed by the infolding of the lateral edges. The anterior part of the terminal segment is very convex, upon which elevation are situated three large tubercles in a transverse row, the center one being in the median line. At the base of the terminal excavation is also a small tubercle. Both branches of the uropoda are similarly shaped, being of the same width throughout their entire length and rounded posteriorly. The outer branch is somewhat shorter than the inner branch; neither reach the extremity of the abdomen.

Individuals were found at Gualala, California, on *Haliotis rufescens*, by Dr. R. E. C. Stearns; also, one specimen at Catalina Harbor, California, and one at Popoff Island, Aleutian Islands, at low water, by Mr. W. H. Dall.

Type.—No. 22569, U.S.N.M. Popoff Island, Aleutian Islands.

23. DYNAMENE BENEDICTI, new species.

Body oblong, oval; surface minutely granular; color, dark gray.

Head with small median point. Eyes situated post-laterally. First pair of antennæ extend to the middle of the first thoracic segment; first joint of peduncle longest; second and third joints about equal in length; flagellum contains six joints. Second pair of antennæ extend to the posterior margin of the second thoracic segment; flagellum contains about eleven joints.

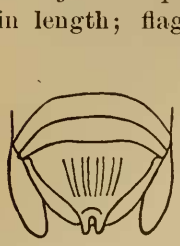


FIG. 10.—DYNAMENE BENEDICTI. × 13⅓. LAST THORACIC SEGMENT AND ABDOMEN.

The thoracic segments are of equal length. The epimera are square with rounded posterior angles.

The penultimate abdominal segment is crossed by suture lines, indicative of coalesced segments. The terminal segment is triangular, terminating posteriorly in two teeth separated by a narrow, rounded, funnel-shaped sinus. This segment is very convex, and bears two longitudinal ridges on either side of the median line. The uropoda do not exceed in length the extremity of the terminal segment. Both branches are rounded posteriorly and are similar in shape and size.

The type was collected by Mr. Heath at Monterey Bay, California, at the surface. No. 22570, U.S.N.M.

24. DYNAMENE GLABRA, new species.

Body oval; surface smooth.

Head small; eyes situated post-laterally. First pair of antennæ extend to the eye; first joint oblong; second joint short, half as long as first; flagellum contains six articles. Second pair of antennæ extend to the posterior margin of the first thoracic segment; flagellum contains about ten articles.

Thoracic segments are subequal; the first is a little longer than any of the others.

FIG. 11.—DYNAMENE GLABRA. × 13⅓. ABDOMEN AND LAST TWO THORACIC SEGMENTS.

The penultimate abdominal segment consists of several coalesced segments, as indicated by the suture lines. The terminal segment is triangular, with a small median excavation at its extremity. The lower part of this segment is quite flat, the slope being gradual from the convex upper part or base of segment to the extremity. The inner branch of the uropoda is large and rounded posteriorly; the outer branch is small, though similar in shape, and is much shorter than the inner branch.

A number of specimens were collected by Mr. Heath at Monterey Bay, California at the surface.

Type.—No. 22571, U.S.N.M.

13. SPHÆROMA Latreille.

ANALYTICAL KEY TO THE SPECIES OF SPHÆROMA.

a. Body widening gradually from head backwards. Thorax transversely ridged and provided with three longitudinal rows of small tubercles. Branches of the uropoda very large, expanded ..... 25. *Sphæroma amplicauda* Stimpson.

a'. Body not increasing in width. Surface of thorax smooth. Branches of the uropoda not expanded.

b. Extremity of abdomen produced in a rhomboid process.

26. *Sphæroma rhomburum*, new species.

b'. Extremity of abdomen not produced.

c. Surface of abdomen tubercular..... 27. *Sphæroma octoncum*, new species.

c'. Surface of abdomen smooth ..... 28. *Sphæroma oregonensis* Dana.

25. SPHÆROMA AMPLICAUDA Stimpson.

Sphæroma amplicauda STIMPSON, Proc. Bos. Soc. Nat. Hist., VI, 1857, p. 89.

Habitat.—Tomales Bay, California.

Stebbing[1] suggests that a new genus near *Cycloidura* may be required for this species.

26. SPHÆROMA RHOMBURUM, new species.

Surface of body punctate; color, whitish yellow.

Head small. First pair of antennæ reach almost to the posterior margin of the first thoracic segment. Second pair of antennæ extend quite to the posterior margin of the first thoracic segment. Eyes situated postlaterally.

FIG. 12.—SPHÆROMA RHOMBURUM. × 13½. ABDOMEN.

Thoracic segments equal in length. Epimera broad and short, extending downwards, forming an angle with the segments.

First abdominal segment as long as any of the thoracic segments, crossed by suture lines and surmounted by two tubercles, close together, one on either side of the median line. Terminal segment with its extremity produced in a process rhomboid in shape, and with sides infolded, forming a kind of funnel-like opening when seen from beneath. At the base of this segment are two tubercles, which are continuous with two longitudinal ridges in the center of the segment. These ridges unite near the extremity, and continue as one median ridge. The uropoda are shorter than the terminal segment; the outer branch is more lanceolate in shape; both are of equal length.

Two specimens were taken at Monterey Bay, California, by Mr. Heath.

Type.—No. 22573, U.S.N.M.

This species is near *S. egregium* Chilton[2] from Akaroa, but differs in

[1] Hist. Crust., 1893, p. 364.

[2] Trans. New Zealand Inst., XXIV, 1891, p. 269.

the presence of two tubercles on the first abdominal segment, in the presence of two tubercles and two longitudinal ridges uniting in a single ridge on the terminal segment, and in the equality in length of the two branches of the uropoda.

27. SPHÆROMA OCTONCUM, new species.

Body with all the thoracic segments, except the first, marked with four conspicuous brown spots, two on either side of the median line, and with two spots on the first abdominal segment, one on either side of the median line.

Head small. First pair of antennæ reach almost to the posterior margin of the first thoracic segments. Second pair extend fully to the posterior margin of the first segment.

Thoracic segments subequal. Epimera broad and extending downward, forming an angle with the segments.

First abdominal segment with two low tubercles close together, situated one on either side of the median line; terminal segment triangular, with apex narrowly rounded and sides slightly infolded, forming a small opening when seen from below. Six low tubercles are situated on this segment, two in longitudinal series on either side of the median line—the lower ones being a little farther apart than the upper ones—and one on either side of the series. The uropoda do not reach the extremity of the abdomen by some little distance. The outer branch is the shorter and is broadly rounded posteriorly. The inner branch is more pointed at the extremity.

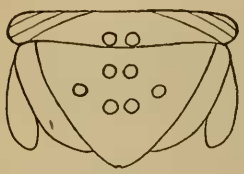


FIG. 13.—SPHÆROMA OCTONCUM. ×13½. ABDOMEN.

Five individuals of this species were sent by Mr. Heath from Monterey Bay, California.

Type.—No. 22574, U.S.N.M.

28. SPHÆROMA OREGONENSIS Dana.

Sphæroma oregonensis DANA, Proc. Acad. Nat. Sci. Phila., VII, p. 177; U. S. Expl. Exp. Crust., II, p. 778, pl. LII, fig. 4.—STIMPSON, Journ. Bos. Soc. Nat. Hist., VI, 1857, p. 69.

Sphæroma olivacea LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 45.

Habitat.—Pacific Grove to Alaska.

14. TECTICEPS Richardson.

ANALYTICAL KEY TO THE SPECIES OF TECTICEPS.

a. Terminal segment of abdomen pointed. Outer branch of uropoda much longer than inner branch. First pair of antennæ reach the posterior angle of the first thoracic segment. Second pair reach the middle of the second thoracic segment. Sixth and seventh pair of legs show a marked disproportion in the length of the propodus.....29. *Tecticeps alascensis* Richardson.

a'. Terminal segment of abdomen widely rounded. Outer branch of the uropoda not longer than inner branch. First pair of antennæ reach the posterior angle of the third thoracic segment. Second pair of antennæ reach the middle of the fourth thoracic segment. Sixth and seventh pairs of legs show only a gradual increase in length. ..... 30. *Tecticeps convexus*, new species.

29. TECTICEPS ALASCENSIS Richardson.

Tecticeps alascensis RICHARDSON, Proc. Biol. Soc. Washington, XI, 1897, pp. 181–183.

Habitat.—Alaska; Kamchatka.

30. TECTICEPS CONVEXUS, new species.

Body oval, somewhat flattened. Surface smooth; color light yellow with markings of brown.

Head with the anterior margin much broader than the posterior margin, produced in front but not wholly concealing the basal joints of the first pair of antennæ, and somewhat raised, forming two small convex elevations. The antero-lateral margin is likewise produced forming an acute angular projection, which extends in a lateral direction beyond the post-lateral margin of the head. The eyes are dorsally situated in a median tranverse line. The first pair of antennæ, with a flagellum of sixteen articles, extend to the posterior angle of the third thoracic segment. The second pair of antennæ, with a flagellum of thirteen articles, extend to the middle of the fourth thoracic segment, and exceed by one joint the length of the first pair of antennæ. Both pairs of antennæ are disposed to lie concealed under the broad epimeral plates of the thoracic segments.

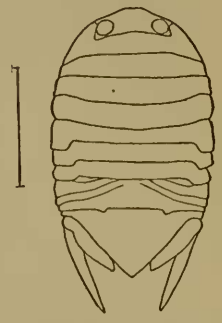


FIG. 14.—TECTICEPS ALASCENSIS RICHARDSON. × 2¼.

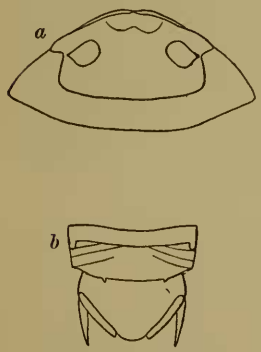


FIG. 15.—TECTICEPS CONVEXUS. *a*, HEAD. × 5⅓. *b*, ABDOMEN AND LAST THORACIC SEGMENT. × 2⅔.

The thoracic segments are subequal in length. The first segment has its antero-lateral angles produced around the anterior portion of the head, forming a broad plate at the side of the segment. The epimera are almost twice as broad as long; those of the fifth segment extend downward, with the anterior margin straight, making the length and breadth about equal, and forming almost square epimera; in the epimera of the sixth and seventh segments, the anterior margins are in the same direction as the posterior margins, which extend downward.

The first segment of the abdomen has three suture lines, and its posterior margin is produced in two small points, one on either side of the median line, about equidistant from it and the lateral margin of the

segment. The terminal segment is widely rounded posteriorly. The inner branch of the uropoda is of nearly equal width throughout its length and is rounded at its extremity; the outer branch is slender and sharply pointed. Both branches are of nearly equal length and neither extend beyond the tip of the abdomen.

The first pair of legs have the propodus dilated and the dactylus reflexible. The propodus is large and oval in shape. In the legs of the second pair the propodus is irregular in shape, sometimes dilated with reflexible dactylus, and sometimes simple. The legs of the other five pairs are similar in structure, ambulatory, and show a gradual increase in length.

A number of individuals were found at Monterey Bay, California, and sent to the U. S. National Museum by Mr. Heath, who gives the following notes of their habits:

> They were taken by the Chinese fishermen from a sandy sea bottom about 30 feet below the surface (according to the Chinese statement). These are rapid swimmers and the moment they are disturbed they roll into a ball and project the exopodite of the last free segment. This is undoubtedly for protection. I have not had time to accurately examine the position nor character of this appendage, but its sharp swordlike nature is readily recognized.

Type.—No. 22572, U.S.N.M.

This species differs from *T. alaseensis* in having longer antennæ and antennulæ; in having a rounded terminal segment, which in that species is very pointed; in having the outer branch of the uropods as short as the inner, which in that species is much longer; in having only a gradual increase in the length of the legs, which in that species show such marked disproportions in the propodus of the sixth and seventh pairs; and in the position of the eyes, which in this species are situated in the median transverse line of the head, while in *T. alaseensis* they are placed in the posterior half of the head.

15. CILICÆA Leach.

ANALYTICAL KEY TO THE SPECIES OF CILICÆA.

a. Surface of body smooth.

b. Terminal segment with three sinuses, one above another, the two upper openings heart-shaped. Terminal segment as broad as long. Outer branch of the uropoda armed with four spines, broad and flat at upper end, and tapering to the extremity, which does not reach beyond the tip of the abdomen.
31. *Cilicæa cordata*, new species.

b'. Terminal segment with a large sinus, in which are placed six sharp teeth. Terminal segment nearly twice as broad as long. Outer branch of the uropoda smooth, slender, cylindrical, and reaching much beyond the tip of the abdomen ..... 32. *Cilicæa caudata gilliana*, new subspecies.

a'. Surface of body densely granulated. Terminal segment with a quadrangular excavation, in the center of which is a long tooth.
33. *Cilicæa granulosa*, new species.

The position of the three following species is somewhat doubtful, since they lack the spine on the penultimate abdominal segment, which

is characteristic of the genus *Cilicæa*. It has been noted by Stebbing,[1] by Miers,[2] and by Haswell[3] that with many species of *Cilicæa*, as well as with some of the other genera of the Sphæromidæ, the spine is present and developed in the males but wanting in the females. As our three new species agree with the generic characters of *Cilicæa* except in the presence of the spine, we consider them for the present new and undescribed species of *Cilicæa*.

31. CILICÆA CORDATA, new species.

Body attenuated in front; color a faint yellow, profusely marked with a delicate pink tint.

Head with the anterior margin thickened, and slightly produced in front. Prominent median point triangularly shaped. Frontal margin broadly lobed on either side of median point. Eye situated at post-lateral angle of head. First pair of antennæ reach beyond the posterior margin of head; first joint of peduncle oblong; second joint very short; flagellum contains about nine articles. The second pair of antennæ extend to the posterior angle of the third thoracic segment; the flagellum contains about fifteen articles.

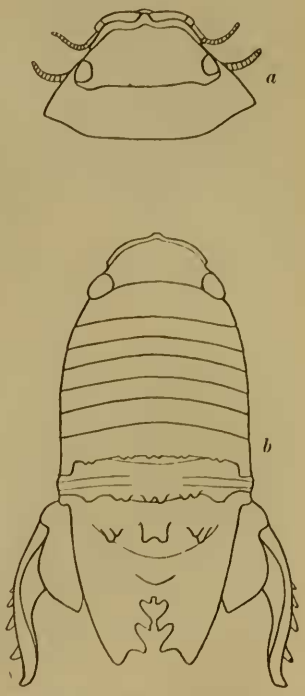


FIG. 16.—CILICÆA CORDATA. × 8. *a*, HEAD AND FIRST THORACIC SEGMENT; *b*, DORSAL VIEW.

The thoracic segments are about equal in length, with the exception of the first, which is a little longer than any of the others. The epimera are very broad and drawn out to an apex, which is rounded. They are scarcely visible in a dorsal view, as they project downward laterally, forming an angle with the segments. The last thoracic segment is furnished with low tubercles on its posterior margin.

On the first abdominal segment are five double tubercles. The terminal segment of the body has three sinuses, one above another, the two upper openings being heart-shaped. Six teeth are grouped in a series of two each, and are placed in such regularity as to give the appearance of a triple sinus. At the base of the upper sinus is a large rounded tubercle, peaked at the top. Three double tubercles are also situated at the base of the abdomen. The inner branch of the uropoda is fixed and immovable; it is broad and pointed

[1] Hist. Crust., 1893, p. 364.
[2] Zool. Coll. *Alert*, 1884, p. 308.
[3] Proc. Linn. Soc. New South Wales, VI, p. 183.

at its extremity and extends two thirds the length of the terminal segment. The outer branch is long and slender, broad and flattened above, more rounded and tapering at the extremity, somewhat incurved, and extends a little beyond the end of the abdomen. Its outer edge is crenulate and its under surface armed with four spines.

The legs are long and slender, all ambulatory, and with dactylus biunguiculate.

Two specimens were collected at Popoff Island (Aleutian Islands) by Mr. W. H. Dall at low water.

Type.—No. 22575, U.S.N.M., Popoff Island.

Another individual was found at Catalina Island, California, by Dr. J. G. Cooper. In this specimen the sixth thoracic segment is also tuberculated. One specimen was found by Mr. Heath at Monterey Bay on the pink coralline at low tide, and is shaded with a delicate pink. In this specimen, on the seventh thoracic segment and the penultimate abdominal segment, the tubercles on either side of the median line of tubercles are single instead of double.

32. CILICÆA CAUDATA GILLIANA, new subspecies.

Body slightly attenuated in front. Color, light brown with markings of black.

Head with anterior margin thickened and slightly produced. Large median point triangularly shaped, on either side of which the frontal margin of the head is broadly lobed. Eye situated at the posterior angle of the head. First pair of antennæ reach beyond the posterior margin of the head; first joint of peduncle is oblong; second joint, very small; flagellum contains eight joints. The second pair of antennæ are broken in the specimens examined.

FIG. 17. CILICÆA CAUDATA GILLIANA. ×8.

The thoracic segments are about equal in length, with short but very broad epimera, which extend downward laterally, forming an angle with the segments. The last segment is ridged with very low tubercles on its posterior margin.

The first abdominal segment has two suture lines, indicative of coalesced segments, and bears five double tubercles. The terminal segment has a large sinus in which are situated six sharp teeth. At the base of the sinus is a large tubercle. Three double tubercles are also found at the base of the terminal segment. The inner branch of the uropoda is affixed to the sides of the abdomen and extends two-thirds of its length; it is triangularly pointed at its extremity. The outer branch is long and slender, almost cylindrical in shape, smooth, somewhat incurved, and extends much beyond the tip of the terminal segment.

The legs, all ambulatory, are slender with dactylus uniunguiculate.

Specimens were dredged off Catalina Island, California.

Type.—No. 22576, U.S.N.M.

These specimens differ from *Cilicæa caudata* (Say),[1] in the presence of six distinct teeth within the sinus of the terminal segment, while in that species there are but four; in the greater development of the spine at the base of the sinus, and in the median double tubercle at the base of the terminal segment.

33. CILICÆA GRANULOSA, new species.

Surface of body densely granulated; granules large and close together.

Head with anterior margin thickened, and produced in a small median point, on either side of which the margin is lobed. Eyes situated postlaterally. First pair of antennæ extend to the posterior margin of the first thoracic segment; first joint of peduncle, oblong; second joint, short. Second pair of antennæ extend to the posterior margin of the third thoracic segment.

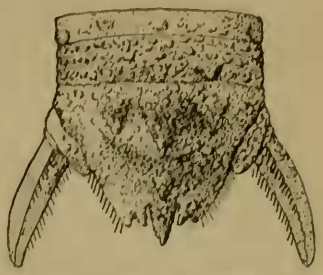


FIG. 18. CILICÆA GRANULOSA. 8. LAST THORACIC SEGMENT AND ABDOMEN.

The first thoracic segment is longer than any of the following segments. The epimera are twice as broad as long.

The first abdominal segment is short and bears indications of three coalesced segments. There are three transverse elevations on this segment which are densely covered with granules. The terminal segment bears three transverse elevations at the base, the median one terminating in a spine. On its posterior margin is a quadrangular excavation, with a long median tooth, bearing a spine at its extremity. At the base of the tooth is a small elevation. On either side of the terminal excavation, a short distance up the lateral margin, is a small spine. The fixed inner branch of the uropoda is small and short; the outer branch is long, blunt at the extremity, somewhat incurved, and reaches, when open, much beyond the terminal segment. The margins of the terminal segment, and the edges of the outer branch of the uropoda, are pubescent.

The legs are all simple, ambulatory.

One specimen from Cerros Island, Lower California, was collected by Mr. A. W. Anthony at a depth of 20 fathoms.

Type.—No. 22649, U.S.N.M.

[1] CILICÆA CAUDATA (Say).

Nasa caudata SAY, Journ. Phil. Acad., I, p. 482.—MILNE-EDWARDS, Hist. Nat. des Crustacés, III, p. 219.

Cymodocea caudata IVES, Proc. Acad. Nat. Sci. Phila., 1891, p. 188, pl. VI, figs. 11–14.

Family VIII. SEROLIDÆ.

16. SEROLIS Leach.

34. SEROLIS CARINATA Lockington.

Serolis carinata LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 36

Habitat.—San Diego, California.

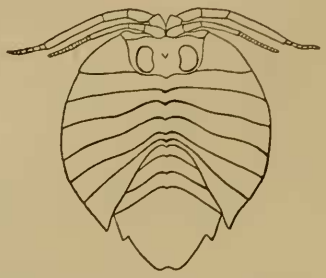


FIG. 19.—SEROLIS CARINATA LOCKINGTON. × 8.

III. VALVIFERA.

ANALYTICAL KEY TO THE FAMILIES OF VALVIFERA.

a. Body more or less broad, depressed. Legs usually nearly alike, but first three pairs sometimes with propodus dilated and dactylus reflexed. Family IX. IDOTEIDÆ (p. 842).

a'. Body narrow, scarcely depressed. Four anterior pairs of legs unlike three posterior pairs, and not ambulatory, nor strictly prehensile, directed forward, slender, ciliated, with terminal joint minute; last three pairs are stouter, ambulatory, with terminal joint bifid..... Family X. ARCTURIDÆ (p. 853).

Family IX. IDOTEIDÆ.

ANALYTICAL KEY TO THE GENERA OF IDOTEIDÆ.[1]

a. Sides of head emarginate or cleft and laterally produced beyond eyes, which are situated upon its dorsal surface. Three anterior pairs of legs, with penultimate joint or propodus dilated and forming, with reflexible dactylus, a prehensile hand..... 17. *Glyptonotus.*

a'. Sides of head in a dorsal view entire and not laterally produced. Eyes lateral. Legs all ambulatory; three anterior pairs with penultimate joint not or not much dilated.

b. Flagellum of second pair of antennæ well developed and multiarticulate.

c. Palpus of maxillipeds four-jointed. Epimera of all the segments well developed and evident in a dorsal view. Abdomen[2] consisting of three[3] segments with lateral sutures, indicative of another partially coalescent segment..... 18. *Idotea.*

[1] See Miers on the Idoteidæ, Journ. Linn. Soc. London, XVI, 1883, pp. 9, 19, 20.

[2] Including terminal segment.

[3] Dollfus, Feuille des Jeunes Naturalistes, 3d ser., 1895, p. 4; Sars, Crust. of Norway, 1897, Pts. 3, 4, p. 79.

c'. Palpus of maxillipeds not four-jointed. Abdomen consisting of one segment, uniarticulate.

d. Maxillipeds with a three-jointed palp. All the epimera coalesced and perfectly united with the segments ..... 19. *Synidotea*.

d'. Maxillipeds with a two-jointed palp. Epimera of second, third, and fourth segments coalesced and perfectly united with the segments; those of the fifth, sixth, and seventh segments distinct and well developed.

20. *Colidotea*, new genus.

b'. Flagellum of second pair of antennæ with joints all consolidated and forming a single piece, or with flagellum composed of only two or three joints.

c. Body smooth, linear. Epimera of all the thoracic segments distinct and visible; those of the second, third, and fourth segments short and narrow; those of the fifth, sixth, and seventh segments large and broad. Palp of maxillipeds two-jointed ..... 21. *Cleantis*.

c'. Body smooth, ovate. Epimera of second, third, fourth, and fifth thoracic segments coalesced with segments; those of sixth and seventh segments distinct and visible. Palp of maxillipeds three-jointed. Joints of flagellum all consolidated and forming a single piece. 22. *Ensymmerus*, new genus.

17. GLYPTONOTUS Eights.

ANALYTICAL KEY TO THE SPECIES OF GLYPTONOTUS.[1]

a. Joints of the peduncle of antennæ not dilated; flagellum eight to fourteen jointed. Antero-lateral cervical lobes prominent....35. *Glyptonotus entomon* (Linnæus).

a'. Joints and peduncle of antennæ greatly dilated; flagellum seven to eight jointed. Antero-lateral cervical lobes not prominent....36. *Glyptonotus sabini* (Krøyer).

35. GLYPTONOTUS ENTOMON (Linnæus).

Oniscus entomon Linnæus, Syst. Nat., 12th ed., II, 1766, p. 1060.—Pallas, Spicil. Zool., IX, 1772, p. 64, pl. v, figs. 1–6.

(?) *Entomon pyramidale* Klein, Rém. sur les Crustacés, figs. 1–3.

Squilla entomon De Geer, Mém. pour servir à l'Hist. des Insectes, VII, 1778, p. 514, pl. xxxii, figs. 1–10.

Asellus entomon Olivier, Encycl. Méth., 1789, p. 253.

(?) *Cymothoa entomon* Fabricius, Ent. Syst., II, 1793, p. 505.

Idotea entomon Bosc, Hist. Nat. des Crust., II, 1802, p. 178.—Latreille, Hist. Nat. Crust. et Ins., VI, 1803–4, p. 361; VII, pl. lviii, figs. 2, 3.—(?) Lamarck, Hist. des Anim. sans Vert., 1st ed., V, 1818, p. 159.—(?) Desmarest, Consid. Crust., 1825, p. 289.—Rathke, Neuste Schriften der naturf. Gesellsch. in Danzig, I, 1820, p. 109, pl. iv.—Krøyer, Vid. Selsk. Skrift., VII, 1838, p. 323.—Milne-Edwards, Hist. Nat. Crust., III, 1840, p. 128.—Krøyer, Nat. Tidsskr., II, 1847, p. 402.—White, List. Cr. Brit. Mus., 1847, p. 93.—Brandt, Cr. in Middendorf's Sibirische Reise, II, 1851, p. 145.—Meinert, Nat. Tidsskr., 3d ser., XI, 1877, p. 81.—Brandt, Comptes Rendus, 1880, p. 713; Ann. Mag. Nat. Hist., VI, 1880, p. 98.

(?) *Saduria entomon* Adams, in White, Sutherland's Voy. Baffin's Bay, etc., Appendix, 1852, p. ccvii.

Idotaya longicauda Lockington, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 45.

Glyptonotus entomon Miers, Trans. Linn. Soc. London, XVI, 1883, pp. 12, 13, pl. 1, figs. 1, 2. (See Miers for further synonymy.)

Habitat.—Circumpolar; West coast of North America to Pacific Grove, California.

[1] This key is taken from Miers, Journ. Linn. Soc. London, XVI (1883), p. 11.

36. GLYPTONOTUS SABINI (Krøyer).

Idotea sabini Krøyer, Nat. Tidsskrift., 2d ser., II, 1847, p. 401; Atlas of Crust. in Gaimard's Voy. en Scand., pl. xxvii, fig. 1.—Reinhardt, Forteguelse over Grönland's Krebsdyr, 1857, p. 34.—Lütken, List of Crust. of Greenland in Arctic Manual, 1875, p. 149.—Sars, Arch. f. Math. og Naturvidensk, II, 1877, p. 350.

Chiridothea megalura G. O. Sars, Archiv. f. Math. og Naturvidenskab., IV, 1880, p. 432.

Glyptonotus sabini Miers, Journ. Linn. Soc., London, XVI, 1883, pp. 15, 16, pl. 1, figs. 3–5. (See Miers for further synonymy.)

Habitat.—Circumpolar; west coast North America (Miers).

18. IDOTEA Fabricius.

ANALYTICAL KEY TO THE SPECIES OF IDOTEA.[1]

a. Terminal segment emarginate at its extremity ..... 37. *Idotea resecata* Stimpson.
a'. Terminal segment not emarginate at its extremity.
  b. Body slender, linear, filiform.
    c. Terminal segment truncate at apex ..... 38. *Idotea gracillima* Dana.
    c'. Terminal segment acute at its extremity.
      d. Postero-lateral angles of terminal segment prominent and separated by a tooth from subtriangular middle portion, which bears a small tooth at the middle..... 39. *Idotea urotoma* Stimpson.
      d'. Postero-lateral angles not separated by a tooth from middle portion. 40. *Idotea rectilineata* Lockington.
  b'. Body oblong-ovate.
    c. Terminal segment regularly rounded, with small median point. 41. *Idotea wosnesenskii* Brandt.
    c'. Terminal segment triangulate posteriorly with subparallel sides.
      d. Epimera of second, third, and fourth segments short, not reaching the post-lateral angles of their respective segments. 42. *Idotea ochotensis* Brandt.
      d'. Epimera of all the segments reaching the post-lateral angles of their respective segments.
        e. Sides of thorax arcuate ..... 43. *Idotea stenops* Benedict.
        e'. Sides of thorax more nearly parallel..... 44. *Idotea whitei* Stimpson.

37. IDOTEA RESECATA Stimpson.

Idotea resecata Stimpson, Bos. Journ. Nat. Hist., VI, 1857, p. 61, pl. xxii, fig. 7; Proc. Bos. Soc. Nat. Hist., 1859, p. 88.—Miers, Journ. Linn. Soc. London, XVI, 1883, p. 45.

Habitat.—Straits Juan de Fuca, opposite Fort Townsend, Vancouver Island; Gulf of Georgia, Orcas Island; Pacific Grove, San Pedro, and Monterey Bay, California.

38. IDOTEA GRACILLIMA Dana.

Idotea gracillima Dana, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 175.—Stimpson, Bos. Journ. Nat. Hist., VI, 1857, p. 505.—Miers, Journ. Linn. Soc. London, XVI, 1883, p. 35.

Habitat.—California.

[1] See Miers, Journ. Linn. Soc. London, XVI, 1883, p. 43.

39. IDOTEA UROTOMA Stimpson.

Idotea urotoma Stimpson, Proc. Acad. Nat. Sci. Phila., 1864, p. 155.—Miers, Journ. Linn. Soc. London, XVI, 1883, p. 31.

Habitat.—Puget Sound.

40. IDOTEA RECTILINEATA Lockington.

Idotea rectilineata Lockington, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 36.—Miers, Journ. Linn. Soc. London, XVI, 1883, p. 31.

Habitat.—Along the Pacific coast from Humboldt County, California, to Ensenada, Lower California.

From an examination of specimens, this species, which Miers[1] says is scarcely to be distinguished from *I. ochotensis* Brandt, is seen to be specifically distinct. It differs from *I. ochotensis* in the proportions of the body, *I. rectilineata* being more slender—about five times as long as broad—while in *I. ochotensis* the length is only three and a half times greater than the width; in the relative length of the antennæ to the body, and the proportions of the joints in the peduncle of the antennæ, the antennæ in *I. ochotensis* reaching only to the posterior margin of the third thoracic segment (in all the specimens examined) the joints of the peduncle being short and stout, while in *I. rectilineata* the antennæ extend to the posterior margin of the fifth thoracic segment, the joints of the peduncle being long and slender; in the form of the anterior margin of the head, the excavation being deeper and wider in *I. rectilineata* than in *I. ochotensis;* in the shape of the first thoracic segment, which in *I. ochotensis* is produced laterally and has the antero-lateral angles truncate, while in *I. rectilineata* this segment is not produced and has rounded antero lateral angles; in the size of the epimera, which are much more slender in *I. rectilineata* than in *I. ochotensis;* and in the shape of the terminal segment of the body, the posterior angle of which in *I. ochotensis* is more acute, the line from the lateral angle to the median angle being excavate, while in *I. rectilineata* this line is straight and the median angle obtuse.

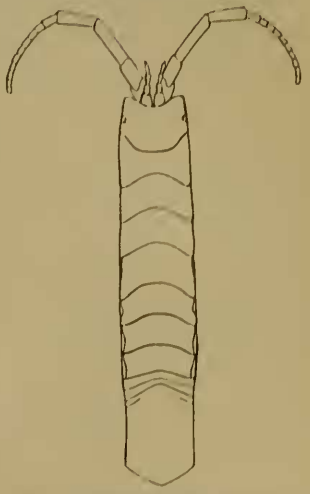


Fig. 20.—Idotea rectilineata Lockington. × 2.

[1] Journ. Linn. Soc. London, XVI, 1883, p. 34.

41. IDOTEA WOSNESENSKII Brandt.

Idotea wosnesenskii BRANDT, Middendorf's Sibirische Reise, II, 1851, Crust., p. 146.—STIMPSON, Bos. Journ. Nat. Hist., VI, 1857, p. 504.—SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 281.—MIERS, Journ. Linn. Soc. London, XVI, 1883, p. 40.

Idotea hirtipes DANA, Cr. U. S. Expl. Exp., Pt. II, 1853, p. 704, pl. XLVI, fig. 6.

Idotea oregonensis DANA, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 175.

Idotea media (DANA?) SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 282.

Habitat.—Sea of Ochotsk and Kamchatka Sea; west coast of North America to Monterey Bay, California.

42. IDOTEA OCHOTENSIS[1] Brandt.

Idotea ochotensis BRANDT, Middendorf's Sibirische Reise, II, 1851, Crust., p. 145, pl. VI, fig. 33.—MIERS, Journ. Linn. Soc. London, 1883, XVI, p. 32, pl. I, figs. 8–10.

Habitat.—Awaatsch Bay, Sea of Ochotsk; northwest coast of North America to Vancouver Island (Miers).

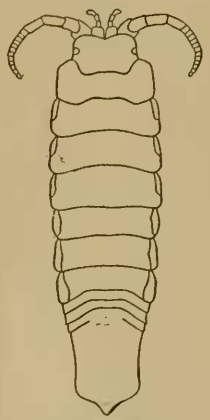


FIG. 21.—IDOTEA OCHOTENSIS BRANDT. × 2.

43. IDOTEA STENOPS Benedict.

Idotea stenops BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 54, 55.

Habitat.—Monterey, California.

44. IDOTEA WHITEI Stimpson.

Idotea whitei STIMPSON, Proc. Acad. Nat. Sci. Phila., 1864, p. 155.—MIERS, Journ. Linn. Soc. London, XVI, 1883, pp. 42, 43.

[1] The following is quoted from Miers, Journ. Linn. Soc. London, XVI, 1883, p. 63: "Mr. Spence Bate (Lord's Naturalist in British Columbia, II, 1866, p. 282) refers without any description, specimens from Esquimault Harbor, British Columbia, to *Idotea stricta* Dana; it is far more probable that they belong to *Idotea ochotensis*."

Habitat.—Puget Sound; Monterey Bay, California, collected by Mr. Heath.

A specimen from Monterey Bay, California, agrees with Miers's description of two males received from California, which he refers to this species. It is unlike *Idotea wosnesenskii* in the following points, and from an examination of a large number of individuals of *I. wosnesenskii*, in which these points remain constant, it seems to demonstrate the impossibility of uniting the two species.

1. "Form of epimera of second to fourth thoracic segments, which reach quite to the postero-lateral angles of these segments.

2. "Epimera of the second segment are broader anteriorly, and the terminal segment more resembles that of *I. ochotensis*, being more angulated and less rounded at the postero-lateral angles."[1]

3. The absence of hairs on the legs.

The legs of *I. wosnesenskii* (the males) are thickly covered with hairs and very bushy in appearance.

4. The smooth margins of the epimera, which in *I. wosnesenskii* have thickened edges.

19. SYNIDOTEA Harger.

ANALYTICAL KEY TO THE SPECIES OF SYNIDOTEA.[2]

a. Abdomen emarginate or notched at its distal end.
  b. Two spines or tubercles overhanging the frontal notch.
    c. Spines united near the base ..... 45. *Synidotea pallida* Benedict.
    c'. Tubercles free at base ..... 46. *Synidotea erosa* Benedict.
  b'. No spines or tubercles overhanging frontal notch.
    c. With a low ridge arising between the eyes, and interrupted on the median line.
      d. Outlines of abdomen subparallel ..... 47. *Synidotea nebulosa* Benedict.
      d'. Outlines strongly arcuate ..... 48. *Synidotea angulata* Benedict.
    c'. Without a ridge between the eyes.
      d. Outline of abdomen subtriangular.
        e. Front not excavated ..... 49. *Synidotea consolidata* (Stimpson).
        e'. Front excavated ..... 50. *Synidotea bicuspida* (Owen).
      d'. Outlines of abdomen rounded.
        e. Length of abdomen equal to width at base.
          51. *Synidotea laticauda* Benedict.
        e'. Length of abdomen equal to one and one-half times width at base.
          52. *Synidotea harfordi* Benedict.
a'. Abdomen pointed.
  b. Undulations of body not tubercular or spiny.
    c. Tubercle in front of eyes not margined ..... 53. *Synidotea nodulosa* (Krøyer).
    c'. Tubercle on the frontal margin and forming a part of it.
      54. *Synidotea lævis* Benedict.
  b'. Undulations of the body tubercular and spiny.
    c. Four spines on the front of the head; body spinous.
      55. *Synidotea muricata* (Harford).
    c'. A wedge-shaped tubercle behind the frontal notch; body tubercular.
      56. *Synidotea picta* Benedict.

[1] Miers, Journ. Linn. Soc. London, XVI, 1883, pp. 42, 43.
[2] Benedict, Proc. Acad. Nat. Sci. Phila. (1897), p. 391.

Mr. Adrian Doilfus in his paper on "Les Idoteidæ des Côtes de France,"[1] has wrongly confounded *Synidotea* Harger with *Stenosoma* Leach. *Synidotea* can by no means be considered a synonym of *Stenosoma*, as anyone who is familiar with the two genera will undoubtedly admit. It differs from *Stenosoma* in the consolidation of the epimera with the segments. The epimera are firmly and perfectly united with the segments, and the only trace or indication of a separation is represented in the anterior segments by a slight and almost imperceptible notch in the posterior margins, halfway between the lateral margin and the median line of the body, and in the three posterior segments by a very faint line. In *Stenosoma* all the epimera are very distinct from the segments.

45. SYNIDOTEA PALLIDA Benedict.

Synidotea pallida BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 396, 397.

Habitat.—Chirikof Island, Alaska.

46. SYNIDOTEA EROSA Benedict.

Synidotea erosa BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 397–399.

Habitat.—Sannakh Island, Alaska.

47. SYNIDOTEA NEBULOSA Benedict.

Synidotea nebulosa BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 394, 395.

Habitat.—Unalaska; Kyska Harbor; Semidi Islands; Unimak Island; Bering Sea; Kamchatka.

48. SYNIDOTEA ANGULATA Benedict.

Synidotea angulata BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 395, 396.

Habitat.—Off Cape Johnson, Washington; off Destruction Island, Washington; off Cape Flattery, Washington.

49. SYNIDOTEA CONSOLIDATA (Stimpson).

Idotea consolidata STIMPSON, Proc. Cal. Acad. Sci., I, 1856, p. 89; Bos. Journ. Nat. Hist., VI, 1857, p. 503.
Edotia bicuspida MIERS, Journ. Linn. Soc. London, XVI, 1883, p. 66.
Synidotea consolidata BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, p. 393.

Habitat.—Pacific Grove, California.

50. SYNIDOTEA BICUSPIDA (Owen).

Idotea bicuspida OWEN, Crustacea of the *Blossom*, 1839, p. 92, pl. XXVII, fig. 6.
Idotea pulchra LOCKINGTON, Proc. Cal. Acad. Sci., VII, 1877, p. 44.
Idotea bicuspida MIERS, Journ. Linn. Soc. London, XVI, 1883, p. 66.
Synidotea bicuspida SARS, Crust. Norwegian North Atlantic Expedition, 1885, p. 116, pl. X, figs. 24–26.—BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 391, 392.

Habitat.—West coast of Alaska and Bering Sea.

[1] Feuille des Jeunes Naturalistes, 1895.

51. SYNIDOTEA LATICAUDA Benedict.

Synidotea laticauda BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 393, 394.

Habitat.—San Francisco Bay.

52. SYNIDOTEA HARFORDI Benedict.

Idotea marmorata HARFORD, Proc. Cal. Acad. Sci., VII, 1877, p. 117.
Synidotea harfordi BENEDICT, Proc. Acad. Sci. Phila., 1897, p. 402.

Habitat.—Magdalena Bay, Lower California.

53. SYNIDOTEA NODULOSA (Krøyer).

Idotea nodulosa KRØYER, Naturhist. Tidssk., II, 1846, p. 100.
Synidotea nodulosa HARGER, Report of U. S. Commissioner of Fish and Fisheries, 1878, Pt. 6, pp. 351, 352.—BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 398, 399.

Habitat.—Dixon Entrance, north of Queen Charlotte Islands, British Columbia.

54. SYNIDOTEA LÆVIS Benedict.

Synidotea lævis BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 399, 400.

Habitat.—Between Bristol Bay and Pribilof Islands, Alaska; Bering Sea.

FIG. 22.—MAXILLIPED OF COLIDOTEA ROSTRATA (BENEDICT).

55. SYNIDOTEA MURICATA (Harford).

Idotea muricata HARFORD, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 117.
Synidotea muricata BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, p. 400.

Habitat.—Icy Cape.

56. SYNIDOTEA PICTA Benedict.

Synidotea picta BENEDICT, Proc. Acad. Nat. Sci. Phila., 1897, pp. 401, 402.

Habitat.—Alaska and Bering Straits.

20. COLIDOTEA,[1] new genus.

57. COLIDOTEA ROSTRATA (Benedict).

Idotea rostrata BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 53, 54.

Habitat.—San Pedro, California.

[1] See key on p. 843 for characters of genus.

21. CLEANTIS Dana.

ANALYTICAL KEY TO THE SPECIES OF CLEANTIS.

a. Flagellum consolidated and forming a single piece. Sides of abdomen not separated by an acute tooth from rounded posterior portion.
58. *Cleantis occidentalis*, new species.

a'. Flagellum composed of three joints. Sides of abdomen separated by an acute tooth from rounded posterior portion.....59. *Cleantis heathii*, new species.

58. CLEANTIS OCCIDENTALIS, new species.

Body narrow, elongate; surface smooth.

Head of same width as thoracic segments, and with a small, median anterior depression. Eyes lateral. First pair of antennæ consisting of four joints, reaching the middle of the third joint of the second pair of antennæ. Second pair of antennæ contain six joints (five seen from a dorsal view), the last joint being the flagellum.

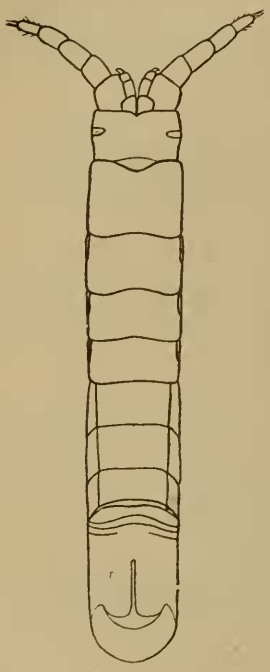


FIG. 23.—CLEANTIS OCCIDENTALIS. × 10.

The thoracic segments show a gradual, though marked, decrease in length, the first one being the longest and somewhat excavate on its anterior margin. The epimera of the second, third, and fourth segments are short and narrow, reaching but half the length of the segments, while those of the last three segments are broad, with their posterior angles produced beyond the segments.

The abdomen is composed of four segments, three short ones and the terminal segment, which bears suture lines indicative of another coalesced segment. The terminal segment is rounded posteriorly. The anterior three-fourths of the segment is raised considerably above the posterior fourth, which is flat, and there is a groove in the median line on the posterior third of the anterior part of the segment.

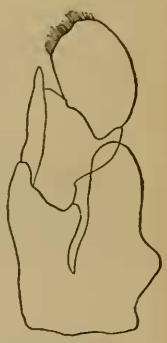


FIG. 24. — MAXILLIPED OF CLEANTIS OCCIDENTALIS. GREATLY ENLARGED

The legs are similar to those of the type species of the genus. The three anterior pairs increase in length, the third pair being the longest, and all are directed anteriorly. The fourth pair are very short and fold across the body. The last three pairs increase in length, the seventh pair being the longest, and all these are directed posteriorly. The legs are compact and lie folded on the ventral side and can not be seen from a dorsal view.

There is but one specimen collected by the *Albatross* in 1888 at Magdalena Bay, Lower California; depth, 12 fathoms.

Type.—No. 22578, U.S.N.M.

This species, when compared with *Cleantis planicauda*[1] Benedict, from Pensacola, Florida, presents points of difference which are interesting and which can easily be recognized in the manuscript quoted below.

59. CLEANTIS HEATHII, new species.

Body slender, elongate; surface smooth.

Head with lateral margins straight; anterior margin slightly excavate. Eyes small, lateral. First pair of antennæ consist of four joints and are a little longer than half the width of the head. The second pair of antennæ are half as long as the body and are composed of nine

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[1] CLEANTIS PLANICAUDA Benedict, new species.

Body linear, densely granulated, five times longer than broad. Feet folded beneath out of view from above. Body lined longitudinally, by six more or less broken black lines. The lines on the sides are more distinct than those above.

Head subquadrate, partially immersed in the first thoracic segment and rounded on the posterior margin; sides parallel, anterior margin emarginate; a deep depression or groove runs from the median notch to the center of the head. The eyes are situated near the antero-lateral angle; post-occipital lobe distinct; antennæ with six segments; first very short and nearly immobile; second very short and stout; the third segment is equal in length to the second, but not so stout; the fourth and fifth are of equal length and about one-third longer than the second and third segments. The terminal segment or flagellum is lighter in color, and is armed with short bristles. The length of the antennæ is equal to the length of the head and first two thoracic segments. The antennulæ extend to the middle of the third segment of the antennæ. The first segment is quadrate; the second subquadrate; the third is pear-shaped; the fourth segment is very small.

The segments of the thorax are nearly equal in length and breadth, the third and fourth being but little longer than the others. The epimera of the second, third, and fourth segments are very small and can not be seen from above. On the fifth, sixth, and seventh segments the epimera are large and project well behind the margin of the segment in the form of an acute angle.

The pleon is composed of four segments; the first three are very narrow; the terminal segment is elongated with subparallel sides. A marked character of the pleon is its obliquely truncated extremity. The oblique terminus is perfectly flat with a raised margin.

The feet of this species, as in the typical species described by Dana, are in two series. The first is composed of the first three pairs of feet, which are comparatively stout and increase in length to the third segment. The second series begins on the fourth segment with a pair of short feet, which fold transversely, the other pairs are successively longer and fold backwards. The feet of the second series are much more slender than those of the first. The dactyli of all are biunguiate. The carpal and propodal joints are spinulose beneath.

The operculum is not traversed by an oblique line. The sides of the basal segment are subparallel. The terminal segment is about as broad as long.

Length, 15 mm.; width, 3 mm.

Type.—No. 22579, U.S.N.M.

joints, the three terminal ones forming the flagellum, which can not be distinguished from the peduncle.

Thoracic segments subequal, with narrow epimera, those of the second, third, and fourth segments reaching but half the length of the segments, the last three epimera extending to the extremity of the segments.

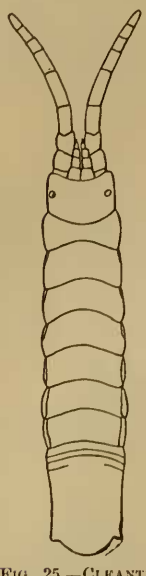

FIG. 25.—CLEANTIS HEATHII. × 6⅔.

The abdomen is composed of three segments with suture lines indicative of another. The terminal segment is broadly rounded posteriorly, with small but acute lateral angles. The sides are almost parallel.

The first four pairs of legs are directed anteriorly; the last three extend in a posterior direction. There is no perceptible inequality in length. The dactyli are bifid.

Two specimens were sent by Mr. Heath from Monterey Bay, California.

Type.—No. 22577, U.S.N.M.

22. EUSYMMERUS, new genus.

Body elliptical. Palp of maxillipeds three-jointed. Second pair of antennæ with joints of flagellum all consolidated and forming a single piece. Eyes dorsally situated.

Lateral margins of thoracic segments expanded, edges straight and full. Epimera of second, third, fourth, and fifth segments coalesced and firmly united with segments, those of the sixth and seventh segments distinct and visible.

Abdomen composed of one segment with suture lines indicative of another partly coalesced segment.

60. EUSYMMERUS ANTENNATUS, new species.

Body elliptical, tapering toward the extremity; surface smooth.

Head three times broader than long, with the antero lateral angles prominent. Anterior margin excavate. Lateral margins expanded. Eyes situated dorsally on the extreme lateral margin in the median transverse line. First pair of antennæ four-jointed, short, extending only a little beyond the second joint of the second pair of antennæ. Second pair of antennæ are six-jointed, geniculate, the last or flagellar joint being somewhat clavate.

Thoracic segments with lateral margins expanded. Lateral edges straight, full. Epimera of second, third, fourth, and fifth segments coalesced and firmly united with the segments; epimera of sixth and seventh segments distinct and articulating with segments.

Abdomen of only one segment with suture lines indicative of another partly coalesced segment. Abdomen posteriorly rounded, tapering from the base to the extremity.

Legs slender, with dactyli biunguiculate.

Color of specimen brown. Lateral edges of thoracic segments colorless.

FIG. 26.—EUSYMMERUS ANTENNATUS. × 8.

FIG. 27.—MAXILLIPED OF EUSYMMERUS ANTENNATUS.

One individual from off Abreojos Point, Lower California, station 2835, was collected by the U. S. Fish Commission steamer *Albatross;* depth, 48 fathoms.

Type.—No. 22580, U.S.N.M.

Family X. ARCTURIDÆ.

23. ARCTURUS Latreille.

Flagellum of second pair of antennæ more than four-jointed. Fourth segment of thorax not greatly longer than others. Marsupium of female composed of four pairs of plates. Posterior thoracic legs biunguiculate.

ANALYTICAL KEY TO THE SPECIES OF ARCTURUS.[1]

a. End of abdomen notched, as seen from above.
b. Body smooth and free from spines ..... 61. *Arcturus beringanus* Benedict.
b'. Body spiny.
c. Head and six segments of thorax each with a pair of spines on the dorsum. Second and third articles of antennæ without spines.
62. *Arcturus longispinis* Benedict.
c'. Head and segments of thorax with not less than two pairs of spines to the segment.
d. Head with one large median spine on anterior part of head in front of eyes.
63. *Arcturus intermedius*, new species.
d'. Head with three spines on anterior part of head in front of eyes.
64. *Arcturus murdochi* Benedict.
a'. End of abdomen without notch ..... 65. *Arcturus glaber* Benedict.

[1] Dr. Benedict's key is used in part for the genus *Arcturus*. Proc. Biol. Soc. Washington, XII (1898), pp. 42, 43.

61. ARCTURUS BERINGANUS Benedict.

Arcturus beringanus BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 46, 47.

Habitat.—Alaska; Bering Sea.

62. ARCTURUS LONGISPINIS Benedict.

Arcturus longispinis BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 44, 45.

Habitat.—Aleutian Islands.

63. ARCTURUS INTERMEDIUS, new species.

Head, with a deep excavation on its anterior margin, the antero-lateral angles being produced in a double process, the inner one rounded, the outer one acutely pointed. Near the anterior margin in the median line is one large spine. Just back of the eyes and between them are two long spines. The lateral margins of the head are produced in two small angulations with a rounded sinus between, posterior to the double antero-lateral process. On the post-lateral margin on either side of the head is a small spine.

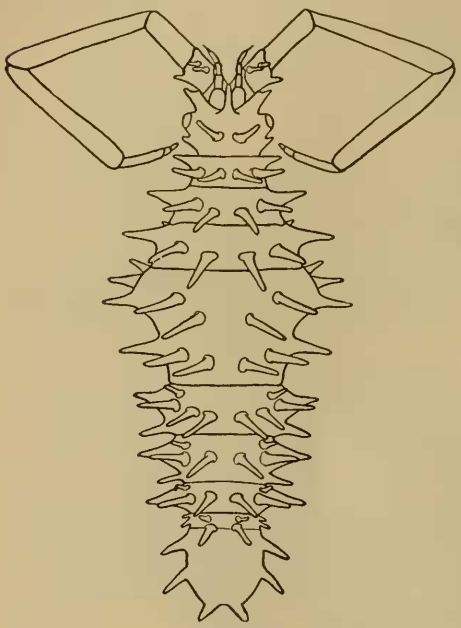

FIG. 28.—ARCTURUS INTERMEDIUS. × 10.

The first pair of antennæ are small and short, not reaching to the end of the second joint of the second pair of antennæ. The first joint of the second pair of antennæ is visible and unarmed; the second joint is armed with three spines; the third joint is unarmed, and is about twice as long as the second joint; the fourth and fifth joints are about equal in length and are each about twice as long as the third; the flagellum contains three joints.

The first, second, and third thoracic segments have a transverse row of six large spines, three on either side of the median longitudinal line, the two center ones being the longest, although all are very long. The fourth segment is twice as long as any of the other segments, and has a transverse constriction on the posterior half of the segment. On the anterior portion are six spines, three on either side of the median line, the four outer ones being in a straight line, the inner two below this line. On the posterior portion are six spines also, three on either side

of the median line. The fifth thoracic segment has twelve spines, six on either side of the median line. The sixth segment has ten spines, five on either side. The seventh and last segment has eight spines, four on either side.

The abdomen is composed of two segments. The first is short, with twelve spines, six on either side of the median line, the four inner ones being arranged in two longitudinal series, the two upper ones being small, the two lower ones very long. The terminal segment has the upper surface smooth. This segment terminates in two long divergent spines. There is a single spine on the lateral margin on either side halfway down the segment. The three anterior pairs of legs have each two spines on the coxal joint and one spine on the basis. The body increases in width from the first to the fourth segment, and then decreases in width from the fourth to the terminal segment.

One specimen from Kyska Harbor, Aleutian Islands, 10 fathoms, collected by Mr. W. H. Dall.

Type.—No. 22581, U.S.N.M.

Our species differs from *A. murdochi* in the absence of spines on the third joint of the second pair of antennæ; in the greater length of this joint in relation to the preceding joint; in the greater length of the two following joints; in the presence of a single spine on the anterior part of the head, while in *A. murdochi* there are three, and of two spines on the posterior part, while in *A. murdochi* there are four; in the absence of two small spines just below the constriction in the fourth segment; in the absence of the row of spines on the terminal segment of the body; and in the presence of two spines on the coxal joint and one on the basal joint of the legs, while in *A. murdochi* there is but one spine on the basal joint.

This species is also distinguished from *A. hystrix* in the presence of a single median spine on the anterior part of the head, while in *A. hystrix* there are two, one on either side of the median line and widely separated; in the presence of two spines on the posterior part of the head, while in *A. hystrix* there are four; in the absence of the double row of spines on the terminal segment of the body; and in the absence of the spine at the articulation of the third joint of the second pair of antennæ.

64. ARCTURUS MURDOCHI Benedict.

Arcturus murdochi BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, pp. 49, 50.

Habitat.—Point Franklin, Alaska.

65. ARCTURUS GLABER[1] Benedict.

Arcturus glabrus BENEDICT, Proc. Biol. Soc. Washington, XII, 1898, p. 46.

Habitat.—Bering Sea.

[1] *Glabrus* by error.

IV. ASELLOTA.

ANALYTICAL KEY TO THE FAMILIES OF ASELLOTA.[1]

a. Lateral parts of cephalon scarcely expanded. Eyes, when present, small, lateral. Peduncle of inferior antennæ without small accessory appendage outside of third joint. Legs ambulatory, except first pair, which are distinctly subcheliform; legs with dactylus generally uniunguiculate. First pair of pleopoda in female very small, not operculiform. Outer lamella of second pair very large and incrusted, so as to form, together with corresponding lamellæ of other side, a sort of operculum, covering the two succeeding pairs.

Family XI. ASELLIDÆ (p. 856).

a'. Lateral parts of cephalon usually lamellarly expanded. Eyes, when present, usually subdorsal. Peduncle of inferior antennæ generally with small accessory appendage outside of third joint. Legs subequal in length with dactylus generally bi- or triunguiculate; first pair sometimes prehensile. First pair of pleopoda in female transformed into a single, large opercular plate. Outer lamellæ of two succeeding pairs narrow and confluent with basal part.

Family XII. JANIRIDÆ (p. 856).

Family XI. ASELLIDÆ.

24. ASELLUS Geoffroy.

Dactyli of last six pairs of periopoda uniunguiculate. Lateral margins of segments produced. Eyes distinct, lateral. Mandibles strong, with a three-jointed palp. Head without rostrum.

66. ASELLUS TOMALENSIS Harford.

Asellus tomalensis HARFORD, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, pp. 54, 55.

Habitat.—Tomales Bay, California.

Family XII. JANIRIDÆ.

ANALYTICAL KEY TO THE GENERA OF JANIRIDÆ.

a'.[2] Eyes dorsal. Antennæ of first pair well developed, with multiarticulate flagellum. Antennæ of second pair long, with multiarticulate flagellum, peduncular joints not dilated. Mandibles with a three-jointed palp, and with cutting part separated from molar part by a deep incision.

b. Head without any true rostrum. First pair of antennæ extremely small with flagellum rudimentary. Second pair of antennæ of moderate length, without any distinctly squamiform appendage. First pair of legs not prehensile. Uropoda extremely small, branches very short, nodiform.. 25. *Jæra*.

b'. Head with prominent rostral projection, or with a comparatively small rostrum, or without rostrum. First pair of antennæ well developed; flagellum multiarticulate. Second pair of antennæ very much elongated with a well-marked scalelike appendage outside of third joint. First pair of legs prehensile, carpus large, subfusiform, and edged inside with spines; propodus narrow, linear, and very movably articulated to carpus, so as to admit of being bent in against it. Uropoda largely developed, with branches slightly unequal.

[1] Sars, Crust. of Norway, II, 1897, Pts. 5, 6, pp. 95, 98.

[2] Idem, Pts. 5, 6, pp. 98–100, 103, 104.

c. Head with lateral parts produced to very prominent acute lappets. Segments of thorax with lateral parts laciniate and produced. Caudal segment forming on each side, at the end, a triangular expansion ..... 26. *Ianthe*.

c'. Head with lateral parts not produced into lappets. Segments of thorax with lateral parts not produced, not laciniate. Caudal segment rounded, not expanded laterally ..... 27. *Janira*.

a'. Eyes lateral. Antennæ of the first pair small with flagellum obsolete. Antennæ of the second pair short, with peduncular joints dilated, rudimentary flagellum, containing five articles, and equal in length to the width of the head. Mandibles with a three-jointed palp, and with cutting part composed of five teeth ..... 28. *Jaropsis*.

25. JÆRA Leach.

67. JÆRA WAKISHIANA Spence Bate.

Jæra wakishiana SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 282.—C. BOVALLIUS, Bihang till K. Sv. Vet. Akad. Handl., II, 1886, No. 15, p. 49.

Habitat.—Esquimault Harbor, British Columbia.

26. IANTHE Bovallius.

ANALYTICAL KEY TO THE SPECIES OF IANTHE.

a. Head with prominent rostrum; lateral margins incised and produced into two angulations. Second and third thoracic segments with epimeral lobes double. Terminal segment of body with lateral angulations and central portion acute. 68. *Ianthe triangulata*, new species.

a'. Head without rostrum; lateral margins entire and produced into one anterior angulation. Second and third thoracic segments with epimeral lobes single. Terminal segment of body with lateral angulations and central portion blunt and rounded ..... 69. *Ianthe erostrata*, new species.

68. IANTHE TRIANGULATA, new species.

Surface of body smooth; color yellow, marked with black dots.

Head with rostrum in front equal to one-half the length of head. Anterior margin lobate, between the rostrum and the lateral angulations. The side of the head is produced in two angulations, the upper one extending in an oblique direction and not reaching beyond the anterior margin of the head. The first pair of antennæ are not as long as the width of the head. The second pair of antennæ are longer than the body.

The lateral margins of the first segment are produced into two angulations; those of the second and third into two, with the epimera produced into two-lobed angulations; those of the fourth into two lobes, the small epimeral lobe or angulation between; and those of the fifth, sixth, and seventh into one large upper lobe, and one small lower lobe.

The terminal segment is produced backward at the sides into two sharply pointed angulations, with a broad triangulate central lobe between, to which the uropoda are attached. The uropoda are longer

than the terminal segment, the outer branch somewhat shorter than the inner one, and both fringed with hairs.

First pair of legs prehensile; remaining pairs simple.

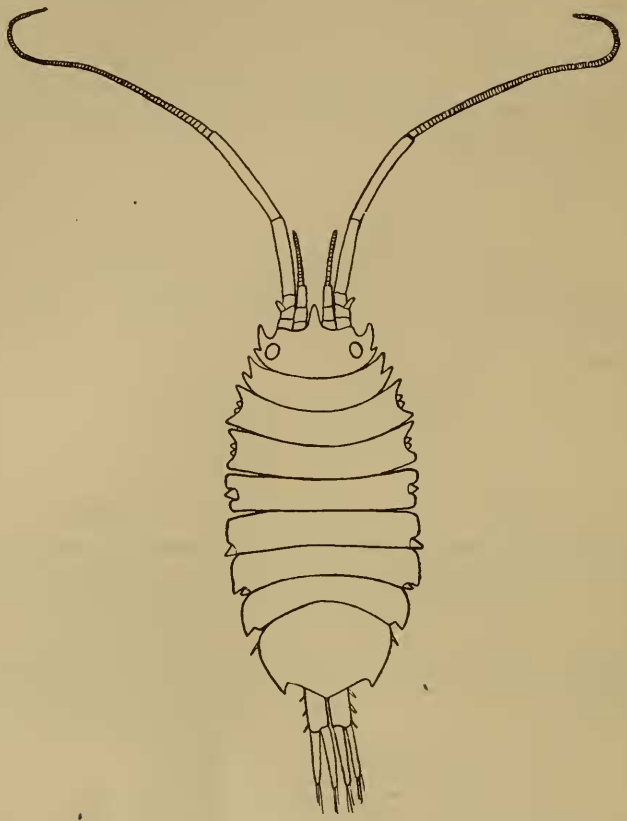

FIG. 29.—IANTHE TRIANGULATA. × 13¼.

Two specimens were collected by Mr. Heath at Monterey Bay, California.

Type.—No. 22582, U.S.N.M.

69. IANTHE EROSTRATA, new species.

Head two and a half times broader than long, with prominent antero-lateral angulations. Lateral margins produced, entire. In place of the rostrum, which marks all the other known species of this genus, there is a small median point. The eyes are dorsally situated a short distance from the lateral edges. The first pair of antennæ are short, not equal to the width of the head. The second pair are broken in the specimen examined.

The first thoracic segment is produced laterally in two angulations. The second, third, and fourth segments are each produced in two angu-

lations, with a small epimeral lobe in between. The fifth, sixth, and seventh segments have each a large anterior lobe and a small posterior epimeral lobe.

The terminal segment has two bluntly triangular angulations, one on either side of a bluntly triangular central portion. The uropoda are about as long as the caudal segment, are styliform, with branches nearly equal. The first pair of legs are prehensile. The others are simple, biunguiculate. One specimen was collected at Chichagof Harbor, Attu (Aleutian Islands), by Mr. W. H. Dall.

Type.—No. 22610, U.S.N.M.

FIG. 30.—IANTHE EROSTRATA. × 13¾.

27. JANIRA Leach.

70. JANIRA OCCIDENTALIS Walker.

Janira occidentalis WALKER, Trans. Liverpool Biol. Soc., XII, 1898, pp. 280, 281, pl. XV, figs. 7-10.

Habitat.—Puget Sound, Washington.

28. JÆROPSIS Koehler.

71. JÆROPSIS LOBATA, new species.

Surface of body smooth.

Color very peculiar and striking. The head is brown. The first thoracic segment is perfectly white, without any markings. The second, third, and fourth segments are brown. The fifth and sixth are white. The seventh thoracic segment and the caudal segment are brown. This peculiar marking gives the body a striped appearance.

Head large; front produced into a prominent triangular process, with rounded apex, very broad at the base, occupying half the anterior margin of the head. The antero-lateral angles of the head are produced in acute angles on either side to a distance equal to half the length of the frontal process. The eyes, which are small, are situated on the extreme lateral margins of the head. The first pair of antennæ are extremely small, equal in length to less than half the width of the head; flagellum obsolete. The second pair of antennæ are also extremely short, equal in length to the width of the head, with rudimentary flagellum, composed of about five joints, and with peduncular joints dilated. Mandibles have the cutting part composed of five teeth; palp, three-jointed.

The thoracic segments are subequal in length, with lateral edges produced, but not laciniate, and separated from each other by lateral incisions.

Caudal segment regularly rounded, with two small incisions at the place where the uropoda are attached, between which is a rounded lobe. Uropoda are extremely small, short, nodiform.

Legs simple, similar in structure, with biunguiculate dactyli.

Two specimens from Monterey Bay, California, were sent by Mr. Heath.

Type.—No. 22583, U.S.N.M.

This species is very close to *Jæropsis brevicornis*, but differs in the following points: the coloring of the body, which in *J. brevicornis* is perfectly transparent and colorless, with the exception of the head, which is marked with a large brown spot, while in our species the head is dark, as are also the entire second, third, fourth, and seventh thoracic segments and the terminal abdominal segment, the other segments being colorless; in the shape of the terminal segment, which is perfectly rounded in *J. brevicornis* and fringed with hairs, while in our species there are two posterior incisions for the reception of the uropoda, and an absence of hairs; in the larger median lobe on the anterior margin of the head; in the acuteness of the antero-lateral angles of the head, which are rounded in *J. brevicornis;* in the more angular post-lateral angles of the head, and in the more angular antero- and post-lateral angles of the thoracic segments. Other differences are noticed from a comparison of both pairs of antennæ.

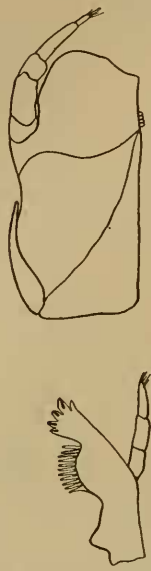

FIG. 31.—MAXILLIPED AND MANDIBLE OF JÆROPSIS LOBATA.

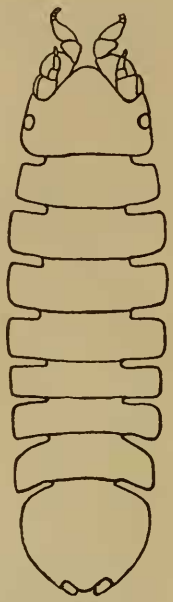

FIG. 32.—JÆROPSIS LOBATA. × 20.

FIG. 33.—ANTENNÆ OF JÆROPSIS LOBATA.

V. ONISCOIDEA.

ANALYTICAL KEY TO THE FAMILIES OF ONISCOIDEA.

a. Flagellum of outer antennæ not multiarticulate. Buccal mass not very prominent below. First maxillæ have two plumose setæ on the inner plate. Mandibles with molar expansion obsolete, without any triturating surface, it being replaced by brushlike recurved setæ. Maxillipeds with terminal part three-

articulate; epignath large, flanking the basal part. Sexual appendage of male simple, and generally connected with inner rami of first pair of pleopoda. Uropoda, with inner branch smaller than outer, and attached far in front of it.

b. External antennæ generally long, close together, with antennal openings large. Body scarcely able to be contracted into a ball. Head less manifestly immersed in first thoracic segment. Lateral parts of the head separated by a vertical marginal and inframarginal line. Clypeus arched. Legs generally long. Uropoda produced, reaching beyond the terminal segment of the abdomen and the post-terminal segment. Terminal segment narrower than preceding ones and conically produced at end..... Family XIII. ONISCIDÆ (p. 861).

b'. External antennæ generally short, with antennal openings small. Body able to be contracted into a ball. Head immersed in first thoracic segment. Lateral parts of the head undifferentiated. Clypeus perpendicular. Legs generally short. Uropoda short, not reaching beyond the epimera of the terminal segment of the abdomen or the post-terminal segment. Terminal segment short and broad ..... Family XIV. ARMADILLIDIDÆ (p. 865).

a'. Flagellum of outer antennæ multiarticulate. Buccal mass prominent. First maxillæ have three plumose setæ on the inner plate. Mandibles with molar expansion large and broad, exhibiting a finely fluted triturating surface. Maxillipeds with terminal part distinctly five-articulate; epignath short. External sexual appendages in male double. Inner ramus of first pair of pleopoda of a similar structure in both sexes. Uropoda with both branches styliform..... Family XV. LIGIIDÆ (p. 865).

Family XIII. ONISCIDÆ.

ANALYTICAL KEY TO THE GENERA OF ONISCIDÆ.

a. Flagellum of external antennæ biarticulate. External opercular ramus of the first, second, and rarely of the third or all the pairs of the abdominal appendages furnished with trachea.

b. Lateral lobes of the head large; frontal lobe more or less projecting. Eyes subdorsal. First two abdominal segments generally very short; three following ones large, with large epimera. Terminal segment not reaching beyond the epimera of preceding segment. Uropoda somewhat even; longer in male than in female..... 29. *Porcellio.*

b'. Lateral lobes of head small, hardly projecting; frontal lobe obsolete. Eyes lateral. First two abdominal segments scarcely shorter than those following. Epimera of all the segments small. Terminal segment extending beyond the epimera of preceding segment. Uropoda subequal in both sexes. 30. *Metoponorthus.*

a'. Flagellum of external antennæ triarticulate. External opercular ramus of abdominal appendages containing no special respiratory organ.

b. Front of head produced at the middle and at the sides in tubercles; lateral tubercles hornlike. Epimera of abdominal segments moderate or small. 31. *Alloniscus.*

b'. Front of head not produced; with lateral lobes. Epimera of abdominal segments large ..... 32. *Lyprobius.*

29. PORCELLIO Latreille.

ANALYTICAL KEY TO THE SPECIES OF PORCELLIO.

a. Surface of body smooth.

b. Frontal median lobe of head rounded, a little produced. Articles of the flagellum of external antennæ equal in length. Last segment of the abdomen with its extremity widely rounded..... 72. *Porcellio formosus* Stuxbërg.

b'. Frontal median lobe of head more acute, minute. First article of the flagellum of external antennæ equal in length to the other or a little longer. Last segment of the abdomen with its extremity acute... 73. *Porcellio lævis* Latreille.

a'. Surface of body closely and roughly granulated.... 74. *Porcellio scaber* Latreille.

72. PORCELLIO FORMOSUS Stuxberg.

Porcellio formosus STUXBERG, Öfversigt af Vetensk. Akad. Forhandl., 1875, No. 2, p. 57.—BUDDE-LUND, Crust. Isop. Terrestria, 1883, p. 141.

Habitat.—San Francisco and San Pedro, California.

73. PORCELLIO LÆVIS Latreille.

Porcellio lævis LATREILLE, Hist. Crust. Ins., VII, p. 46; Gen. Crust., I, p. 71.—LEACH, Edinb. Encycl., VII, p. 406; Transact., XI, p. 375.

Oniscus lævis LAMARCK, Hist. nat. an. s. vert., V, p. 154; 2d ed., V, p. 261.

(?) *Porcellio lævis* RISSO, Crust. Nice, p. 156; Hist. Nat., pp. 119, 163.—DESMAREST, Consid., p. 321.

(?) *Porcellio degeerii* AUDOUIN and SAVIGNY, Descript. de l'Égypte, p. 289, pl. XIII, fig. 5.

Porcellio cucercus BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 177.—MILNE-EDWARDS, Hist. Nat. des Crust., III, p. 168.

Porcellio syriacus BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 178.—MILNE-EDWARDS, Hist. Nat. des Crust., III, p. 170.

Porcellio musculus BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833.

Porcellio cinerascens BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 178.

Porcellio dubius BRANDT, Bull. Soc. Imp. d. Moscou, VI, 1833, p. 178.—MILNE-EDWARDS, Hist. Nat. des Crust., III, p. 170.

Porcellio poeyi GUÉRIN, Comptes Rendus, 1837, p. 132.

Porcellio lævis MILNE-EDWARDS, Hist. Nat. des Crust., III, p. 169; Règne an. Planch, p. 71, *bis*, fig. 2.

Porcellio urbicus KOCH, Deutsch. Crust., p. 36.

Porcellio degeerii BRANDT, Wagner Reise Alg., III, 1836, p. 278.

Porcellio ovatus ZADDACH., Synops., p. 13.

Porcellio flavipes KOCH, Berichtig, etc., p. 206, pl. 8, fig. 97.

Porcellio degeerii LUCAS, Expl. d'Alg., I, pp. 69, 139.

Porcellio lævis LEREBOULLET, Mém. de la Soc. de Strasbourg, IV, p. 45, pl. I, fig. 7; pl. III, figs. 55–60.

Porcellio poeyi GUÉRIN, Ramon de la Sagra, Crust., p. 67.—SAUSSURE, Mém., p. 61, pl. V, fig. 34.

Porcellio cubensis SAUSSURE, Mém., p. 61, pl. V, fig. 35.

Porcellio sumichrasti SAUSSURE, Mém., p. 62, pl. V, fig. 36.

Porcellio cotillæ SAUSSURE, Mém., p. 62, pl. V, fig. 37.

Porcellio mexicanus SAUSSURE, Mém., p. 63, pl. V, figs. 39, 40.

Porcellio aztecus SAUSSURE, Mém., p. 63, pl. V, fig. 38.

Porcellio interruptus HELLER, Verh. Zool. Bot. Ges. Wien, XI, p. 495; Novara Exp., p. 136, pl. 12, fig. 6 (vix adult).

Porcellio lævis PLATEAU, Crust. Isop., p. 10.—BUDDE-LUND, Nat. Tidsskrift., 3d ser., VII, p. 236.

Porcellio aztecus MIERS, Proc. Zool. Soc. London, 1877, p. 669.

Porcellio lævis ULJANIN, Crust. Turkest., p. 17, pl. 4, figs. 1–10.—BUDDE-LUND,[1] Crust. Isop. Terrestria, 1885, pp. 138–141.—HANSEN, Bull. Mus. Comp. Zool. Harvard College, XXXI, 1897, p. 124.

[1] See Budde-Lund for further synonymy.

Habitat.—Distribution world-wide; Colfax, California (Cook and Jaquay); Monterey, California; Unalaska.

74. PORCELLIO SCABER Latreille.

Oniscus asellus LINNÆUS, Fn. Su., p. 2058; Syst. Nat., I, p. 1061; in part.
Porcellio scaber LATREILLE, Hist. Crust. Ins., VII, p. 45; Gen. Crust, I. p. 70.—LEACH, Edinb. Encycl., VII, p. 406.
Oniscus granulatus LAMARCK, Hist. Nat. des animaux sans vertèbres, V, p. 154; 2d ed., V., p. 261.
Porcellio scaber RISSO, Crust. de Nice, p. 155; Hist. Crust., p. 119.
Porcellio nigra SAY, Journ. Phil. Acad., I, p. 432.
Porcellio granulatus BRÉBISSON, Mém. Soc. Calv., 1825, p. 261.
Porcellio scaber DESMAREST, Consid. Crust., p, 321.—BRANDT and RATZEBURG, Med. Zool., II., p. 77, pl. 12, figs. 1–4 and A–B.—BRANDT, Consp., p. 14 (Bull. Soc. Imp. d. Naturalistes de Moscou, VI, 1833).
Porcellio brandtii MILNE-EDWARDS, Hist. Nat. des Crust., III, p. 168.
Porcellio granulatus MILNE-EDWARDS, Hist. Nat. des Crust., III, p. 169, pl. 32, fig. 21.
Porcellio scaber MILNE-EDWARDS, Cuvier Rg. An., 1849, pl. 71–71 *bis*.
Porcellio nigra GOULD, Rep. Crust., p. 337.
Porcellio scaber KOCH, Deutschlands Crust., p. 34.
Porcellio dubius KOCH, Deutschlands Crust., p. 34.
Porcellio asper KOCH, Berichtig, p. 207, pl. 8, fig. 98.
Porcellio scaber LEREBOULLET, Mém. Strasb., IV, p. 34, pl. 1, figs. 4, 5; pl. 2, figs. 43–47.
Porcellio gemmulatus DANA, Crust. U. S. Expl. Exp., 1853, p. 725, pl. 47, fig. 7.—STIMPSON, Journ. Bos. Soc. Nat. Hist., VI, p. 66.
Philoscia tuberculalata STIMPSON, Proc. Cal. Acad. Sci., I, p. 89.
Porcellio scaber SILL, Crust. Sieb., 1861, p. 3.—BATE and WESTWOOD, Brit. Crust., II, p. 475.
Porcellio paulenses HELLER, *Novara* Exp., p. 136, pl. 12, fig. 5.
Porcellio scaber PLATEAU, Bull. Acad. r. Belgique, 2d ser., XXIX, 1870, No. 2, p. 8.—E. BRANDT, Horæ Soc. Ent. Rossi, VIII, p. 167.—BUDDE-LUND, Nat. Tidsskrift., 3d ser., VII, p. 238; Prospectus, p. 3; Bos, Crust., Hedrioph. Nederl., pp. 38, 91.—BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 129–131.[1]

Habitat.—Distribution world-wide; San Francisco, California; San Pedro, California; Puget Sound.

Budde-Lund suggests that *Porcellio gemmulatus* Dana differs in no wise from *Porcellio scaber*.[2]

30. METOPONORTHUS Budde-Lund.

75. METOPONORTHUS PRUINOSUS Budde-Lund.[3]

Metoponorthus pruinosus BUDDE-LUND, Crust. Isop. Terrestria, 1885, pp. 169, 170.
Porcellio maculicornis KOCH, Deutschlands Crustaceen, 1840, p. 34.—STUXBERG, Øfversigt af Vetensk. Akad. Forhandl., 1875, No. 2, p. 55.

Habitat.—California.

[1] See Budde-Lund for further synonymy.
[2] Crust. Isop. Terrestria, 1885, p. 131.
[3] See Budde-Lund for further synonymy.

31. ALLONISCUS Dana.

ANALYTICAL KEY TO THE SPECIES OF ALLONISCUS.

a. Surface of body very densely granulated. Margins of epimera serrated.
76. *Alloniscus mirabilis* Stuxberg.

a'. Surface of body punctate.

b. Lateral processes of the head large, prominent.
77. *Alloniscus cornutus* Budde-Lund.

b'. Lateral processes of the head small, scarcely prominent.
78. *Alloniscus perconvexus* Dana.

76. ALLONISCUS MIRABILIS (Stuxberg).

Rhinoryctes mirabilis Stuxberg, Öfversigt af Vetensk. Akad. Forhandl., 1875, No. 2, p. 51.

Alloniscus mirabilis Budde-Lund, Crust. Isop. Terrestria, 1885, p. 229.

Habitat.—California.

77. ALLONISCUS CORNUTUS Budde-Lund.

Alloniscus cornutus Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 228, 229.

Habitat.—California.

78. ALLONISCUS PERCONVEXUS Dana.

Alloniscus perconvexus Dana, Proc. Acad. Nat Sci. Phila., VII, p. 176.—Stimpson, Journ. Bos. Soc. Nat. Hist., VI, p. 66.—Budde-Lund, Crust. Isop. Terrestria, 1885, p. 225.

(?) *Alloniscus maculosus* Harford, Proc. Cal. Acad. Sci., Pt. 1, VII, 1877, p. 54-

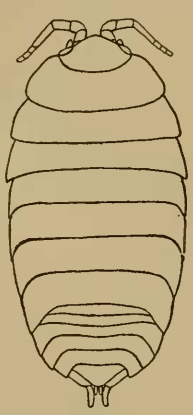

Fig. 34. — Alloniscus perconvexus Dana. × 8.

Habitat.—California; Pacific Grove: Santa Barbara; Monterey Bay, collected by Mr. Heath; Tillamook Head, Oregon.

32. LYPROBIUS Budde-Lund.

79. LYPROBIUS PUSILLUS Budde-Lund.

Lyprobius pusillus Budde-Lund, Crust. Isop. Terrestria, 1885, p. 230.

Habitat.—California.

Family XIV. ARMADILLIDIDÆ.

33. CUBARIS Brandt.

Outer branch of the uropoda small or minute, rather smooth. Terminal segment not shorter than uropoda. Terminal segment posteriorly truncate. Clypeus very short, with the superior margin entire, lobated at the sides. Terminal abdominal segment subtetragonal. External branch of the uropoda inserted in the middle of the internal lateral margin of the basal joint.

ANALYTICAL KEY TO THE SPECIES OF CUBARIS.[1]

a. Last abdominal segment longer than broad. 80. *Cubaris californica* (Budde-Lund).
a'. Last abdominal segment a little transverse, with median constriction. Antennæ minutely roughened ..... 81. *Cubaris affinis* (Dana).

80. CUBARIS CALIFORNICA (Budde-Lund).

Armadillo speciosus STUXBERG, Øfversigt af Vetensk. Akad. Forhandl., 1875, No. 2, p. 62.
Armadillo californica BUDDE-LUND, Crust. Isop. Terrestria., 1885, p. 40.

Habitat.—California: San Francisco and San Pedro.

Budde-Lund[2] remarks that perhaps this species does not differ from *Cubaris affinis* (Dana).

81. CUBARIS AFFINIS (Dana).

Spherillo affinis DANA, Proc. Acad. Nat. Sci. Phila., VII, 1854, p. 176.—STIMPSON, Journ. Bos. Soc. Nat. Hist., VI, 1857, p. 65.
Armadillo affinis BUDDE-LUND, Crust. Isop. Terrestria, 1885, p. 39.

Habitat.—California.

Family XV. LIGIIDÆ.

ANALYTICAL KEY TO THE GENERA OF LIGIIDÆ.

a. Uropoda equal in length, styliform, often filiform. Interior mala of the mandibles with numerous pencils of hairs. Last segment of body broad, with distinct epimeral plates. Maxillipeds with palp four to five jointed; epignath rounded ..... 34. *Ligia*.
a'. Uropoda unequal in length.
b. Extremity of uropods furnished with two long apical bristles. Interior mala of right mandible with three pencils of hairs, of left mandible with five pencils of hairs. Last segment of body small and without any epimeral plates. Maxillipeds with a five-jointed palp; epignath narrow, linguiform.. 35. *Ligidium*.
b'. Extremity of uropods not furnished with two long apical bristles. 36. *Styloniscus*.

[1] *Cubaris* is oldest synonym of preoccupied *Armadillo* (Stebbing, Hist. of Crust., 1893, p. 433).

[2] Crust. Isop. Terrestria, 1885, p. 40.

34. LIGIA Fabricius.

ANALYTICAL KEY TO THE SPECIES OF LIGIA.

a. External antennæ shorter than the body.

b. Caudal stylets about equal to half the length of body.

82. *Ligia occidentalis* Dana.

b'. Caudal stylets about equal to one-fifth the length of body.

83. *Ligia pallasii* Brandt.

a'. External antennæ longer than body, or equal to length of body. Caudal stylets about equal to two-thirds length of body..... 84. *Ligia exotica* Roux.

82. LIGIA OCCIDENTALIS Dana.

Ligia occidentalis Dana, U. S. Expl. Exp. Crust., II, p. 712, pl. xlix, fig. 7; Proc. Acad. Nat. Sci. Phila., VII, p. 176.—Stimpson, Bos. Journ. Nat. Hist., VI, 1857, p. 66.—Harford, Proc. Cal. Acad. Sci., VII, 1877, p. 116.—Budde-Lund, Crust. Isop. Terrestria, 1885, p. 264.

Habitat.—California: San Francisco Bay; San Diego; Sacramento River; Monterey Bay; Lower California.

83. LIGIA PALLASII Brandt.

Ligia pallasii Brandt, Bull. Soc. Impér. des Natur. de Moscou, VI, 1833, p. 172.
Ligia dilatata Stimpson, Bos. Journ. Nat. Hist., 1857, p. 67, pl. xxii, fig. 8.—S. I. Smith, Report of Progress of Geological Survey of Canada, 1878–79.
Ligia septentrionalis Lockington, Proc. Cal. Acad. Sci., VII, 1877, Pt. 1, p. 46.
Ligia stimpsoni Miers, Proc. Zool. Soc., 1877, p. 671 (see footnote).
Ligia pallasii Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 261, 262.

Habitat.—Unalaska; Sitka; Tanager, Aleutian Islands; Victoria, Vancouver Island; Puget Sound; California.

84. LIGIA EXOTICA Roux.

Ligia exotica Roux, Crust. Médit., p. 3, pl. xiii, fig. 9.
Ligia grandis Perty, Spix. H. Martius, p. 212, pl. xl, fig. 13.
Ligia gaudichaudii Milne-Edwards, Hist. Nat. des Crust., III, p. 157.
Ligia baudiniana Milne-Edwards, Hist. Nat. des Crust., III, p. 155.
Ligia (Italica) coriacea Koch, Deutschl. Crust., p. 36; Berichtig., p. 211.
Ligia gaudichaudii Dana, Expl. Exp., p. 741, pl. xlix, figs. 6*a–h*.—Nicolet, Gay, Hist. Chile, III, p. 265.
Ligia baudiniana Miers, Proc. Zool. Soc., 1877, p. 670.
Ligia exotica Budde-Lund, Crust. Isop. Terrestria, 1885, pp. 266–268.

Habitat.—Widely distributed; California; Topolobampo, Mexico (Mr. Edward Palmer).

35. LIGIDIUM Brandt.

ANALYTICAL KEY TO THE SPECIES OF LIGIDIUM.

a. Inner process of the basal article of the uropoda three times shorter than the terminal external branch; internal terminal branch reaching the apex of the external branch: the two terminal hairs equal in length to the external branch.

85. *Ligidium hypnorum* (Cuvier).

a'. Inner process of the basal article of the uropoda four times shorter than the terminal external branch; internal terminal branch long, extending much beyond the apex of the external branch, being a sixth part longer; the two terminal hairs short, equal in length to half the external branch.

86. *Ligidium tenue* Budde-Lund.

85. LIGIDIUM HYPNORUM (Cuvier).

Oniscus hypnorum Cuvier, Journ. d'hist. nat. II, p. 19, pl. 26.
Ligidium hypnorum Budde-Lund, Naturhistorisk Tidsskrift, 3d ser., VII, 1870, p. 225.—Stuxberg, Öfversigt af Vetensk. Akad. Forhandl., 1875, No. 2, p. 48.

Habitat.—California (Stuxberg).

86. LIGIDIUM TENUE Budde-Lund.

Ligidium tenue Budde-Lund, Crust. Isop. Terrestria, 1885, p. 258.

Habitat.—Sitka Island.

36. STYLONISCUS Dana.

87. STYLONISCUS GRACILIS Dana.

Styloniscus gracilis Dana, Proc. Acad. Nat. Sci. Phila., VII, 1854–55, p. 176.—Stimpson, Journ. Bos. Soc. Nat. Hist., VI, 1857, p. 66.—Budde-Lund, Crust. Isop. Terrestria, 1885, p. 271.

Habitat.—California.

VI. EPICARIDEA.

Family XVI. BOPYRIDÆ.[1]

Body of female primarily disciform, variously modified subsequently by retrogressive metamorphosis; distinctly segmented; more or less asymmetrical, twisted now to right, now to left; dorsal face flattened; head deeply sunk in thorax and carrying in front two pairs of rudimentary antennæ; eyes, when present, dorsal. Maxillipeds lamellar, biarticulate, obtecting the oral area below, and more frequently exhibiting a small terminal joint, and, at base, two curved lanceolate appendages. Legs, seven pairs, sometimes obsolete on one side, and all of same structure, short, prehensile; coxal plates obsolete or distinctly defined. Incubatory plates, five pairs, more or less arching over the ventral face of the thorax; first pair, as a rule, concealed by second and divided by a transversal fold into two segments. Abdomen more or less distinctly segmented; pleopoda, forming simple or double lamellæ, all of the same structure, rarely obsolete. Uropoda, when present, simple lanceolate. Male elongate, very small, symmetrical; segments of thorax distinct, those of abdomen sometimes distinct, sometimes confluent Mouth parts simple, conic; posterior antennæ with flagellum four-articulate; legs of uniform structure; uropoda with inner branch shorter than outer. Parasitic on decapodous crustacea.[2]

[1] Sars, Crustacea of Norway, II, 1898, pp. 195, 196. pls xi, xii.

[2] Bopyridæ parasitic on *Crangon crangon* (Linnæus), *Nectocrangon lar* (Owen), *Nectocrangon alaskensis* Kingsley, and other shrimps, have been reserved for more detailed study.

This family has not been sufficiently worked up to offer as yet any systematic arrangement of the genera.[1]

37. ARGEIA Dana.

ANALYTICAL KEY TO THE SPECIES OF ARGEIA.

a. Head transverse. All the thoracic branchial appendages present. All the abdominal appendages present ..... 88. *Argeia pugettensis* Dana.

a'. Head bilobate. Thoracic branchial appendages apparently absent in some of anterior segments. Last three pairs of abdominal appendages wanting. 89. *Argeia depauperata* Stimpson.

88. ARGEIA PUGETTENSIS Dana.

Argeia pugettensis Dana, U. S. Expl. Exp. Crust., II, p. 804, pl. LIII, fig. 7.—Stimpson, Bos. Journ. Nat. Hist., VI, 1857, p. 71.

Habitat.—Puget Sound on *Crangon munita.*

89. ARGEIA DEPAUPERATA Stimpson.

Argeia depauperata Stimpson, Bos. Journ. Nat. Hist., VI, 1857, p. 71.

Habitat.—San Francisco Bay on *Crangon franciscorum.*

38. PHYLLODURUS Stimpson.

90. PHYLLODURUS ABDOMINALIS Stimpson.

Phyllodurus abdominalis Stimpson, Bos. Journ. Nat. Hist., VI, 1857, p. 71.—Lockington, Proc. Cal. Acad. Sci., VII, 1876, Pt. 1, p. 57.

Habitat.—Puget Sound; Tomales Bay, California; "on the common *Upogebia.*"

39. BOPYROIDES Stimpson.

91. BOPYROIDES ACUTIMARGINATUS Stimpson.

Bopyroides acutimarginatus Stimpson, Proc. Acad. Nat. Sci. Phila., XVI, 1864, p. 156.

Habitat.—Puget Sound, on *Spirontocaris brevirostris.*

40. PSEUDIONE Kossmann.

ANALYTICAL KEY TO THE SPECIES OF PSEUDIONE.

a. Antennæ five-jointed. First pair of maxillæ absent. In male, eyes present; maxillæ wanting; last segment of abdomen cordate in form, being narrow anteriorly and having its hinder margin notched. 92. *Pseudione giardi* Calman.

a'. Antennæ four-jointed. Maxillæ normal, present. In male, eyes wanting; maxillæ normal, present; last segment of abdomen triangular and entire. 93. *Pseudione galacanthæ* Hansen.

[1] See Hansen, Bull. Mus. Comp. Zool., Harvard College, XXXI (1897), p. 112.

92. PSEUDIONE GIARDI Calman.

Pseudione giardi CALMAN, Ann. N. Y. Acad. Sci., XI, 1898, No. 13, pp. 274–281, pl. XXXIV, fig. 5.

Habitat.—Puget Sound, on *Pagurus ochotensia* (Brandt).

93. PSEUDIONE GALACANTHÆ Hansen.

Pseudione galacanthæ HANSEN, Bull. Mus. Comp. Zool. Harvard College, XXXI, 1897, pp. 118–120, pl. V, fig. 22*i*.

Habitat.—Gulf of California, in branchial cavity of *Galacantha diomedeæ* var. *parvispina* Faxon.

41. BATHYGYGE Hansen.

94. BATHYGYGE GRANDIS Hansen.

Bathygyge grandis HANSEN, Bull. Mus. Comp. Zool. Harvard College, XXXI, 1897, pp. 122, 124, pl. VI, figs. 2, 2*e*.

Habitat.—Off Acapulco, in branchial cavity of *Glyphocrangon spinulosa* Faxon.

42. CRYPTIONE Hansen.

95. CRYPTIONE ELONGATA Hansen.

Cryptione elongata HANSEN, Bull. Mus. Comp. Zool. Harvard College, XXXI, 1897, pp. 112–115, pl. III, figs. 5, 5*a*; pl. IV, figs. 1, 1*g*.

Habitat.—Near Galapagos Islands, in branchial cavity of *Nematocarcinus agassizii* Faxon, which occurs as far north as Acapulco, Mexico.

43. PARARGEIA Hansen.

96. PARARGEIA ORNATA Hansen.

Parargeia ornata HANSEN, Bull. Mus. Comp. Zool. Harvard College, XXXI, 1897, pp. 120–122, pl. VI, figs. 1, 1*i*.

Habitat.—Off Acapulco Mexico, in branchial cavity of *Sclerocrangon procax* Faxon.

44. IONE Latreille.

97. IONE CORNUTA Spence Bate.

Ione cornuta SPENCE BATE, Lord's Naturalist in British Columbia, II, 1866, p. 282.
Ione thoracica HELLER, Carcinolog. Beitrag z. Fauna der Adriat. Meeres, Verhand. Zool. Bot. Gesellsch. Wien, XV, pp. 979–984, pl. 17.
Ione cornuta BATE and WESTWOOD, Brit. Sessile-Eyed Crust., II, p. 253.—GIARD and BONNIER, Contributions à l'étude des Bopyriens, 1887.

Habitat.—Esquimault Harbor, British Columbia, in branchia of *Callianassa longimana;* Vancouver Island.